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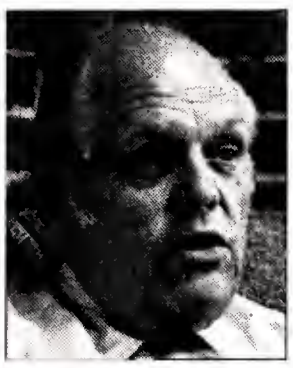

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Software AG raises sights

Mainframe office system will challenge Disoss, Profs

By John Gallant

RESTON, Va. — Software AG last week waded into the deep end of the office automation software pool with the introduction of a mainframe office system that competes against such rivals as IBM's widely used Distributed Office Support System and Professional Office System.

Software AG's Con-Nect office system works in conjunction with the company's Natural fourth-generation language and Adabas data base management system. Con-Nect provides three core capabilities: document handling, electronic mail and schedule management. The system was released in production quantities last week after a two-year development effort, officials said.

Two early users of Con-Nect reported that the product was marginally superior

See **SOFTWARE** on page 8

Micro trends star in Vegas

By Eric Bender

LAS VEGAS — The world's biggest microcomputer carnival returns to the desert this week, with more than 1,200 exhibitors camping out in the Las Vegas Convention Center and four hotels.

Targeted at computer resellers, Comdex/Fall '85 will draw more than 80,000 attendees, according to predictions from The Interface Group, the show's organizer.

While many products introduced during recent months will be demonstrated publicly for the first time at Comdex/Fall, few major offerings will make their formal debut at the giant show. One prime exception is Ashton-Tate's Dbase III Plus package (see story page 6).

Comdex/Fall also is expected to feature significant announcements from Microsoft Corp., including disclosure of new corporate licensing procedures and shipment of the retail version of Microsoft's Windows operating environment.

Numerous application vendors will launch software tailored for personal com-

See **MICRO** on page 6

DP personnel new victims of corporate cuts

By Charles Babcock

NEW YORK — In an era when corporate staffing fashion has shifted suddenly to emphasize a slim look, many MIS departments are finding that the commitment to information systems as a strategic weapon no longer shelters them from personnel cutbacks.

In recent weeks, MIS departments at General Foods Corp., CBS, Union Carbide Corp., AT&T Information Systems and several banks have been caught in general staff reductions. Far from being limited to the lowest levels, the cuts "are across the board, including middle management up to the level of vice-president," according to David W. Phillippy, president of the Association for Systems Management, a metropolitan New York professional group.

In many cases, the cuts come to troubled organizations — companies under pressure from corporate raiders or companies attempting to compete in recently deregulated climates. But other cuts have occurred at highly profitable corporations intent on staying that way.

CBS in New York, which recently laid off 74 of its news staff as part of the price of successfully fighting off a corporate takeover attempt by Ted Turner, is known to be scaling down other areas of the company. MIS has so far received no edict to cut back personnel, but senior staff members said their budget is being reduced and that they expect to see a wave of resignations once the company, as expected, offers an early retirement plan.

AT&T Information Systems in Morristown, N.J., is cutting back 24,000 people by Jan. 1, including MIS staff and managers, officials said. "As each piece was put into Information Systems, we found there

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TOP OF THE NEWS

Hitachi, one of Japan's largest computer manufacturers, is set to announce the opening of a manufacturing plant in a suburb of Oklahoma City within the next two weeks. The plant will reportedly produce large-scale storage devices on the scale of IBM's 3380.

■

AT&T Information Systems will soon announce an OEM agreement with T-Bar, Inc. of Wilton, Conn., to market its matrix switch, industry sources report. It would be the second large OEM-matrix switch contract in recent months. Bytex Corp. of Framingham, Mass., is believed to be the supplier of IBM's recently announced 3728 Matrix Switch Communications Controller. AT&T will reportedly incorporate the T-Bar switch into its Dataphone II line of communications equipment. Software modification will provide an integrated control system across the Dataphone line, sources said.

■

Cullinet Software last week released its new Application Development System/Batch product to six beta site users for what is expected to be a three-month test period. Likely to be officially an-

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CW EXCLUSIVE

IBM abroad: Japanese insider on the NTT deal

In September, IBM announced a joint venture with Japan's Nippon Telegraph and Telephone Corp., the primary goal of which is compatibility between the two companies' networking protocols. The deal between two of the world's largest corporations, scheduled to be officially joined Dec. 18, is expected to have a far-reaching impact on global telecommunications and computer industries.

NTT's Kubo

Kaoru Kubo, who served as NTT's chief negotiator in the complicated and sensitive dealings that led to the joint venture, is vice-president and general manager for advanced communications systems in NTT's newly established international division. Kubo provided personal insights into the venture when he was interviewed in Tokyo by *Computerworld* Update Editor Glenn Rifkin.

What are the implications of the NTT-IBM venture for the U.S. market?

From the viewpoint of NTT, we have two things in mind. First, we were previously dealing mostly with only three of Japan's leading mainframe manufacturers, so IBM Japan's 28% of the market has been missing. So, we'd like to capture some of that market. And if you look worldwide, 70% of the market is filled by IBM products. NTT is basically not a manufacturer. We are a systems integrator; we integrate whole networks, information processing, hardware, software, terminals and local-area and value-added networks. Our position is basically independent from manufacturers. But to have effective systems and to satisfy customer demands appropriately, you have to establish a fairly good relationship with mainframe manufacturers.

But we aren't aiming for the U.S. market itself. Rather, we are looking for the Asian market, Chinese market and Latin America, because to sell integrated systems to the developed countries is very difficult. There are so many very power-

See **JAPANESE** on page 156

NEWSPAPER

Tough export rules stemming tide of illicit computer sales

By Edward Warner
Computerworld News Service

The street value in the Soviet Union of a VAX-11 series minicomputer from Digital Equipment Corp. has risen dramatically during the past two years, according to U.S. Customs Service investigator Roger Urbanski. Soviet users now pay four to five times more for a VAX-11 than they would pay for the mini were it and other high-technology gear not banned from being sold to Eastern bloc nations.

The Soviets are paying more for such equipment because of more restrictive export rules and increased diligence of the U.S. Customs Service and U.S. computer manufacturers, according to Urbanski, who is director of the Customs Service's Strategic Investigations Division. The stepped-up effort to control the illicit export of computers and high-tech goods has come in large part as a direct result of the Soviets' attempt, exactly two years ago this month, to smuggle a VAX-11/780 into the Soviet Union via South Africa, a nation against which the U.S. then had no export restrictions.

The computer was eventually intercepted in Europe, just as it was about to cross into the Eastern bloc. The subsequent wide reportage of the affair, Urbanski said, "did as much for international cooperation [on technology transfer] as any case we've ever had."

New export rules

Since the VAX case, the U.S. Department of Commerce has established new export rules to prevent high-tech smuggling, including the requirement that U.S. computer manufacturers receive a special Commerce Department license in order to be able to sell personal computers, computer peripherals or software outside the U.S. The Commerce Department, which has always passed judgment on the export of each mainframe, requires those seeking the license to certify that they have an export control program in place.

More smugglers, Urbanski said, are also being caught. Last week, the president of a New York company pleaded guilty to attempting to export $9,000 worth of integrated circuits and semiconductor devices to North Korea, another nation on the Commerce Department's list of countries to which U.S. high-tech gear cannot be sold.

While newly strengthened laws and increased vigilance have made it more difficult — and therefore expensive — for the Soviets to acquire U.S.-made computers, the flow of technology out of the U.S. is continuing.

Citing a recent U.S. Department of Defense study, Urbanski said the value of equipment moving out of the country illegally is "on a similar scale to [the sums involved in] drug importation."

Unlike drug smugglers, though, those who acquire high-tech goods for Soviet bloc nations need not worry that possession of a U.S.-made computer will result in their arrest. In fact, Urbanski said, "Many of the [high-tech] products to reach the Soviet Union leave the U.S. legally" and are then diverted, usually first to a neutral nation and then to the Eastern bloc.

Another difference between high-tech smuggling and the drug trade is that computers hidden in mismarked crates have no odors or other characteristics by which Customs Service inspectors may detect them. As recently as last year, the Customs Service had hoped to install small transmitters in computers before the machines left the factory. The transmitters would alert customs inspectors at international shipment points, but the plan was scrapped in the face of objections from computer manufacturers who worried that the transmitter might affect a user's data.

Ultimately, most of the responsibility to prevent high-tech smuggling rests with the computer vendors themselves. "We take it pretty seriously in terms of our equipment being desired" by smugglers, reported DEC spokesman Jeff Gibson, who said more stringent screening procedures are under development at DEC to help the company determine where a foreign sale may eventually be headed.

Control Data Corp., which markets in 33 nations, conducts a Dun & Bradstreet Corp. type of exam on each of its foreign distributors to determine if they are legitimate, according to Hugh Donahue, CDC vice-president for international trade relations. As for CDC mainframes and supercomputers, Donahue maintained that "we know every customer we ship them to."

DEC's Gibson, however, emphasized that industry-standard precautions were already in place at DEC in November 1983 when the attempted smuggling of the VAX-11/780 occurred, and that leads some to wonder how much vendors can do to prevent smuggling.

Reader views make news

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Zilog Unix-based system bows

Supermicro uses AT&T 32-bit microprocessor

By Maura McEnaney

CAMPBELL, Calif. — In a partial departure from its practice of using only proprietary chips in its computers, Zilog, Inc.'s Systems Division subsidiary last week introduced an AT&T Unix-based 32-bit supermicrocomputer driven by AT&T's WE32100 32-bit microprocessor.

The introduction of Zilog's System 8000/32, which can support up to 58 users, marks the first time the company veered from the tradition of implementing proprietary CPU chips in its systems. It is also the first time AT&T's 32-bit chip has been used in non-AT&T products.

In addition to the product rollout, Zilog announced price reductions and 32-bit upgrade capabilities for its 16-bit System 8000 Series 2 supermicro line.

Senior Vice-President Jerald Higgins told reporters last week Zilog opted not to use its forthcoming 32-bit chip in the System 8000/32. The company instead selected the AT&T chip over the few existing 32-bit chips now on the market because of the AT&T processor's optimal performance in the Unix operating system. Scheduled to begin shipping in March, the System 8000/32 will be aimed at government and general business applications, Higgins said.

"We are definitely going to focus in on areas where we have been successful before," he said. According to Higgins, the System 8000/32 is designed to have high-level supermini performance at less than 20% the cost.

The introduction puts Zilog in a ring with some well-established competitors, including vendors such as Altos Computer Systems, Inc., which now markets a Unix workstation. The announcement also puts Zilog somewhat at odds with Digital Equipment Corp.'s Unix version of the Microvax II. But, according to analyst Michael Gross of Framingham, Mass.-based International Data Corp., "They are really going after the minicomputer market.

"They have to deliver support at the end-user level," Gross added. "Anybody can put together hot hardware."

The Zilog supermicro will be available in two versions. The Model 110, which can support up to 26 users, comes with 8M bytes of main memory and up to two 85M-byte, 5¼-in. disk drives. It costs $24,950. The Model 130, priced at $39,950, can support up to 58 users. It has up to 16M bytes of main memory capacity and supports up to four 337M-byte disk drives.

Both supermicro versions support AT&T's Unix System V Release 2.1 Version 1.

The 32-bit upgrade for users of Zilog's 16-bit System 8000 Series 2 systems consists of a CPU board containing the WE321000 microprocessor and the AT&T Unix System V operating system with virtual memory. It is priced at $8,000 and will be available in the second quarter of next year. Between now and June 30, the upgrade will be priced at $4,950.

Also announced by Zilog were the following:

- Expanded memory on the System 8000 Model 12 from 0.5M to 1M byte. Price on the 52M-byte version for 10 users was reduced from $19,950 to $14,950. The same version now is available with an 85M-byte disk for $16,950.
- Expanded memory for the System 8000 Model 22. The 1M-byte Model 22 now comes standard with an 85M-byte disk. Price for the 10-user version was reduced from $26,950 to $24,950.
- Expanded memory and price reductions on the System 8000 Model 32. A 10-user configuration with 1M byte of memory and a 168M-byte disk is now priced at $27,950.

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NEWS

STC shaves high-end disk price by 10%

Reduces cost of disk controller, upgrade

By James Connolly

LOUISVILLE, Colo. — Answering IBM's recent price cuts with its own reductions, Storage Technology Corp. (STC) last week slashed the list price of its undelivered, high-end, dual-capacity disk drive by 10%.

In addition to the 10% price cut for its IBM-compatible 8380 Model E disk drive, the mainframe peripheral manufacturer also announced a 5% reduction in the cost of upgrading single-capacity 8380s to the dual-capacity drive and revealed cuts ranging from 10% to 18% in the cost of its 8890 Sybercache intelligent disk controller.

Fred Moore, STC's manager of worldwide marketing, acknowledged that the STC announcement was a response to IBM's 10% cut in the price of its 3380 Model E disk drive and 5% cut in the single-to-dual-capacity upgrade price [CW, Oct. 28].

"We compete generally at a price somewhat lower than IBM, and we are continuing to do that," Moore said.

According to Moore, STC seeks to price its products at least 10% to 15% below IBM's volume price agreement price.

Revised costs

The price of the dual-capacity STC 8380 Model BE4 version was lowered from $108,200 to $96,200. The cost of upgrading an 8380 single-density model to a dual-density model was cut from $45,050 to $42,800.

In October, STC announced that deliveries of the dual-density 8380 would begin at the end of the second quarter of 1986, six months ahead of schedule.

The price of the 8890 Sybercache controller was reduced from $153,300 to $135,350 for a typical configuration consisting of two directors, a four-channel switch and a 6M-byte cache.

Control Data to sell division; refocuses on core businesses

By Clinton Wilder

MINNEAPOLIS — In its ongoing effort to refocus on its core businesses and pay off its bank debt, Control Data Corp. last week announced the sale of its low-end peripherals business to Xidex Corp. of Mountain View, Calif.

Xidex, a microfilm vendor expanding into data storage, will purchase most of CDC's Business Products Group for a price in the $55 million to $75 million range, according to a CDC spokeswoman. The divested business includes CDC's tape and disk-pack storage products for mainframes and floppy diskettes for micros. The deal is expected to be finalized by Dec. 15.

Scott Whittenburg, a CDC vice-president who heads the group to be divested, said changing storage technologies and market conditions have removed the strategic value of low-end peripherals from CDC's business.

"There is no longer the synergism of our Business Products Group with our peripherals because the storage media is now part of the drives that are sold," he said. "There is still a market for disk packs and ½-in. tape as commodity products for a company like Xidex selling to distributors and end users, but not to our OEM market. Now we can focus on adding value to our OEM base, rather than trying to be all things to all people through all channels."

For Xidex, the acquisition adds computer tape to Xidex's product line, which currently includes flexible and rigid disks.

"This certainly adds to our market presence and gives us more volume through which we can lower our costs," according to Gary Filler, Xidex executive vice-president and chief financial officer.

The sale represents the most significant sign to date that CDC is reversing years of diversification to concentrate on its core businesses — mainframe-related products and services. Facing a fiscal crisis exemplified by its $255.6 million third-quarter loss, CDC has recently announced its intention to divest its ventures in financial services, computerized ticketing and other wide-ranging fields.

The Business Products Group constitutes a major portion of CDC's Peripheral Products Co., which is expected to lose $150 million this year, according to Jonathan Fram of Paine Webber, Inc. CDC will retain its mainframe disk and tape drive businesses and concentrate on sales to OEMs in that marketplace, a spokeswoman said.

"This is the first major step in a very long road of consolidation; they have no other options," according to analyst Michael Geran of E. F. Hutton & Co. "They will concentrate in the high-end and intermediate storage areas where they think they have a shot at economies of scale."

CDC is currently negotiating loan extensions involving an estimated $215 million in short-term debts with its creditor banks. Although company officials say those discussions are proceeding satisfactorily, Geran and other analysts believe CDC's recent divestitures are in direct response to pressures from its lenders.

"Obviously the banks are being very contentious," Geran said. "Control Data still has a lot of work to do. When it is done [selling pieces of its business], the shrunk, slimmed-down company will have retained its mainframe and military computer business, some specialized information services and a limited disk drive business. We're looking at reversing a 10-year pattern of [CDC's intention to sell] computers for education."

Selling Ticketron

CDC had previously announced its intention to sell its profitable Ticketron ticket services business and some segments of Commercial Credit Co., its successful financial services unit. The businesses sold to Xidex were also slightly profitable, earning about $5 million in the last year, according to Geran.

"When you sell assets, you have to sell what is doing well," Geran said.

The sale to Xidex involves 2,000 CDC employees, including 1,000 in Brynmawr, Wales; 300 in Omaha; and 175 in Lincoln, Neb. A spokeswoman said Xidex is expected to make job offers to "the vast majority" of affected workers, but overlaps with products Xidex already makes may result in some layoffs.

In a related development, Systime, Inc., CDC's UK subsidiary, announced it will sell its Leeds, England, manufacturing facility and slash inventories in an attempt to generate cash. A group of major banks are scheduled to meet to discuss the financial future of the subsidiary. Analysts predict CDC will post losses of more than $15.4 million in the UK for the current financial year, with Systime expected to account for some $14 million of that loss.

The CDC purchase marks the third acquisition for Xidex this year. In February, Xidex acquired Dysan Corp. of Santa Clara, Calif., which manufactures a variety of storage media, including rigid disks, disk packs, cartridges and flexible disks. Several weeks ago, the company announced plans to acquire 5½-in. rigid disk manufacturer Charleton Associates of Irvine, Calif.

CW staff member Maura McEnaney contributed to this story.

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Ashton-Tate Dbase III Plus scheduled for Comdex rollout

Enhancements include menu-driven front end, networking support

By Eric Bender

CULVER CITY, Calif. — Ashton-Tate's Dbase III Plus, an upgrade to its flagship product and scheduled for official rollout this week at Comdex Fall '85, features a menu-driven front end and support for local-area networks, according to industry analysts who have viewed the software.

Scheduled to ship by February, the $695 package from the leading supplier of microcomputer data base management software adds relational capabilities to its Assistant mode, which aids new users. Additionally, Dbase III Plus bundles in the tools previously offered in the Dbase III Developer's Release, providing more than 50 enhancements to Dbase III's programming language, analysts said.

The new package also boosts performance, sorting up to twice as fast and indexing up to 10 times as quickly as its predecessor.

Ashton-Tate officials declined to discuss the product.

Good reviews

The analysts, who saw the software demonstrated but did not get hands-on experience, generally gave good reviews to the enhancements but questioned Ashton-Tate's pricing strategy.

"The front end is very slick," according to George Colony of Forrester Research, Inc. in Cambridge, Mass. "Dbase was too difficult to use for most casual users."

"Their menu approach is very easy to use," said Jan Lewis of the Palo Alto Research Group in Palo Alto, Calif. She downplayed the usefulness of alternative approaches based on natural language technology, remarking that "a natural language that understands 90% of what you say and doesn't understand the other 10% is useless for a naive user."

Lewis applauded the network's ability to offer an upgrade path. "You can buy a single-user product today and upgrade to a multiuser network as you expand; that's a nice feature." This scenario permits "growth without planning," she added.

Dbase III Plus includes three main modules: a single-user portion; a data base administrator, which can manage operations on a network; and an access facility, which gives access to the network. Stand-alone Dbase III Plus users wishing to move to a network will begin with the standard package and add three users at a time by purchasing LAN Packs, which cost $995 and include three diskettes with access-facility software.

Users get full Dbase III Plus capabilities as long as the standard package has been installed on a network server. Single-user Dbase III applications can be ported over to the net by rewriting a single line of code, according to one source familiar with the software. Full implementation of security and access measures for multiple users requires additional modifications.

"The network capabilities seem to be appropriate, in terms of record locking, file locking and user access," according to Michael Goulde, market analyst at the Yankee Group in Boston. "My greatest concern is in pricing, which is steep for anything but the smallest network. I'm skeptical whether the loyalty Ashton-Tate's products have developed will carry them at the network level — it's a toss-up."

The Vegas strip: host to Comdex/Fall

Others expressed concern about network pricing and noted that the $695 single-user cost is likely to handicap Dbase III Plus in the low-end data base management market, where Software Publishing Corp.'s PFS:File and IBM's equivalent Filing Assistant dominate.

Although Ashton-Tate can make a case that corporations should standardize on a single data base manager, "the price point is still up there," said Scott Smith of the Gartner Group, Inc. in Stamford, Conn.

Smith also suggested that it may be tough for Ashton-Tate to position the Dbase family away from its power-user beginnings. "The key will be to sell it as easy to use, when it has a reputation for being very difficult to use."

An upgrade from Dbase III will cost $100. No direct upgrade will be offered for the original Dbase II package. By various estimates, the installed base for the Dbase line ranges between 500,000 and one million.

No site licensing arrangements are available, but several analysts suggested that it is only a question of time. "Site licensing is inevitable," Lewis maintained.

"Ashton-Tate is really staying with a single-user orientation," said Judy Davis, an editor with the Boston-based "Seybold Report on Office Systems." "But they have to consider those kinds of things if they want to run in a big office environment."

Dbase III Plus is copy protected and runs on an IBM Personal Computer, Personal Computer XT or AT with 256K bytes of internal memory. The package has import and export capabilities for Lotus Development Corp.'s 1-2-3, DIF, Microsoft Corp. Sylk, ASCII text and Software Publishing's PFS:File and can import Dbase II files. It is compatible with the existing Dbrun runtime version, which costs $50.

The new software will run on IBM PC-DOS 3.1 networks including the IBM PC Network, 3Com Corp. networks and networks running under Novell, Inc.'s Netware operating software.

Dbase III Plus will work on the IBM Token-Ring network as well, when that net becomes available.

Micro trends star in Vegas

From page 1

puter local-area nets, including Innovative Software, Inc., which will demonstrate a network version of its modular Smart Software System.

Comdex/Fall will highlight other moves toward improved communications as well, with a flood of other local net, micro-to-mainframe and micro-to-mini products scheduled to appear.

The show also will spotlight various other industry trends, including vertical-market software, desktop publishing and computer-aided design and manufacturing on micros. And it will host a rapidly growing crop of "artificial-intelligence-based" programs, although most of these offerings provide only a thin veneer of AI technology.

Among software upgrades, Lifetree Software, Inc. will show its Volkswriter 3 word processing package, which features an on-line 170,000-word dictionary and four-function math capability. Office Solutions, Inc. will display Release 4 of its Officewriter word processing program, which also offers math capability, along with expanded network support and keyboard macros. Software Solutions, Inc. will unveil its Dataease 2.5 data base management software, which includes a new procedural language.

On the hardware side, no showstoppers are predicted. Several IBM Personal Computer AT-compatible systems will appear, including models from Tandy Corp., along with the usual handful of portable computers.

Manufacturers of add-on products will display a wide range of offerings for the IBM Personal Computer, including boards compatible with two emerging standards — the Lotus/Intel/Microsoft Expanded Memory Specification and the IBM Enhanced Graphics Adapter.

A host of output devices will debut, with considerable interest focusing on a printer based on proprietary ion deposition technology. Jointly introduced by C. Itoh Electronics, Inc. and Delphax Systems, Inc., the printer will be offered in 30 and 45 page/min versions.

Comdex/Fall kicks off with a keynote speech on Wednesday at 9:30 a.m. by Hewlett-Packard Co. President John Young on "Surviving the Industry Downturn." Exhibitors will staff their booths through Sunday.

While conference sessions are not the show's prime attraction, several may spark considerable interest. The annual "Software Summit," which starts at 12:30 p.m. Thursday, features top industry executives including Microsoft Chairman William Gates and Software Publishing Corp. President Fred Gibbons.

Full conference registration, including exhibits, costs $195, and an exhibits-only admission costs $25.

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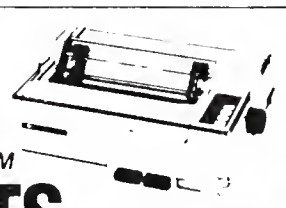
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AT&T trims 184 production workers

NORCROSS, Ga. — AT&T has laid off 184 production employees at its fiber-optic cable manufacturing plant due to a "sharp drop in equipment orders," a spokesman said.

The layoffs represented 7% of 2,600 hourly production workers at the plant, said John Clemons, public relations specialist for AT&T's Atlanta operations. The plant employs a total of 4,100 workers.

No further layoffs are anticipated but were not ruled out. Clemons said that AT&T is "looking at the possibility of rehiring the employees" when and if market conditions improve.

The layoffs, which were effective Nov. 8, were said to be the first this year at the plant and are not connected with recent staff reductions at AT&T Information Systems division.

— James A. Martin

Arete to announce supermini-based optical disk at Comdex

Firm plans doubling of processor power, hard-disk upgrades

By James Connolly

SAN JOSE, Calif. — Arete Systems Corp. will announce this week that it is doubling the processing power of its superminicomputer line, expanding disk capacity and introducing one of the first supermini implementations of optical disk storage technology.

In announcements scheduled for Wednesday at the Comdex/Fall '85 show in Las Vegas, the San Jose-based multiprocessor manufacturer will announce a 1G-byte optical disk drive for its Series 1000 systems.

The write-once drive, to be supplied to Arete by one of two manufacturers to be named later, will be available to Arete's OEM customers, such as Sperry Corp., and to end users of the Series 1000. The Series 1000 is a multiprocessor designed for distributed and departmental processing.

The drive is intended for use in applications such as record keeping in hospitals, libraries and government agencies. An Arete spokesman said it is suited for static data bases, such as medical records that are called up infrequently. He said additions to records on day-to-day transactions can be stored separately until the data base is updated at a later time.

The 12-in. disk drive was designed for compatibility with AT&T Unix System V and to replace tape drive systems. It is scheduled for mid-1986 delivery at an end-user price of $30,000.

Arete will announce that Series 1000 users can double their system performance by swapping their current Motorola, Inc. 68000-based processor boards for Motorola 68020-based boards and upgrading software.

Maximum performance of 2.5 MIPS

Arete's vice-president for marketing, Dave Mackie, said that the Series 1000 now features a maximum performance of 2.5 million instructions per second (MIPS) and that the combination of the 68020 and optimizing code can produce performance of 5 MIPS. The Unix-based processors support up to 88 users in a four-processor configuration.

A 68020 board costs $5,800 with a 68000 board trade-in and $10,400 without a trade-in. The 68020 boards will be available in the first quarter of 1986.

The company also will announce a mass storage expansion cabinet to supplement existing hard-disk storage, which Mackie said has been limited to 600M bytes by the size of the Series 1000 processor cabinet.

Mackie said the new cabinet will support 12 10½-in. disks and four 9-in. tape drives. The disks will provide up to 8G bytes of on-line disk capacity, according to Arete.

Mackie said users can configure mass storage systems as needed using combinations of 168M-byte or 337M-byte 8-in. drives and 474M-byte or 689M-byte 10½-in drives, with prices depending upon the configuration.

CW publisher to issue on-line daily news outlet

LAS VEGAS — CW Communications, Inc., publisher of *Computerworld* newspaper and more than 55 computer-related publications, will unveil at Comdex/Fall '85 this week a new concept in computer industry news delivery. The on-line Computerworld News Service will deliver up-to-date news from around the world on a daily basis.

Designed to aid professionals in computer-related fields with information needed for day-to-day decision making, the news service will draw upon the company's network of newspapers and magazines whose headquarters are located in more than 25 countries.

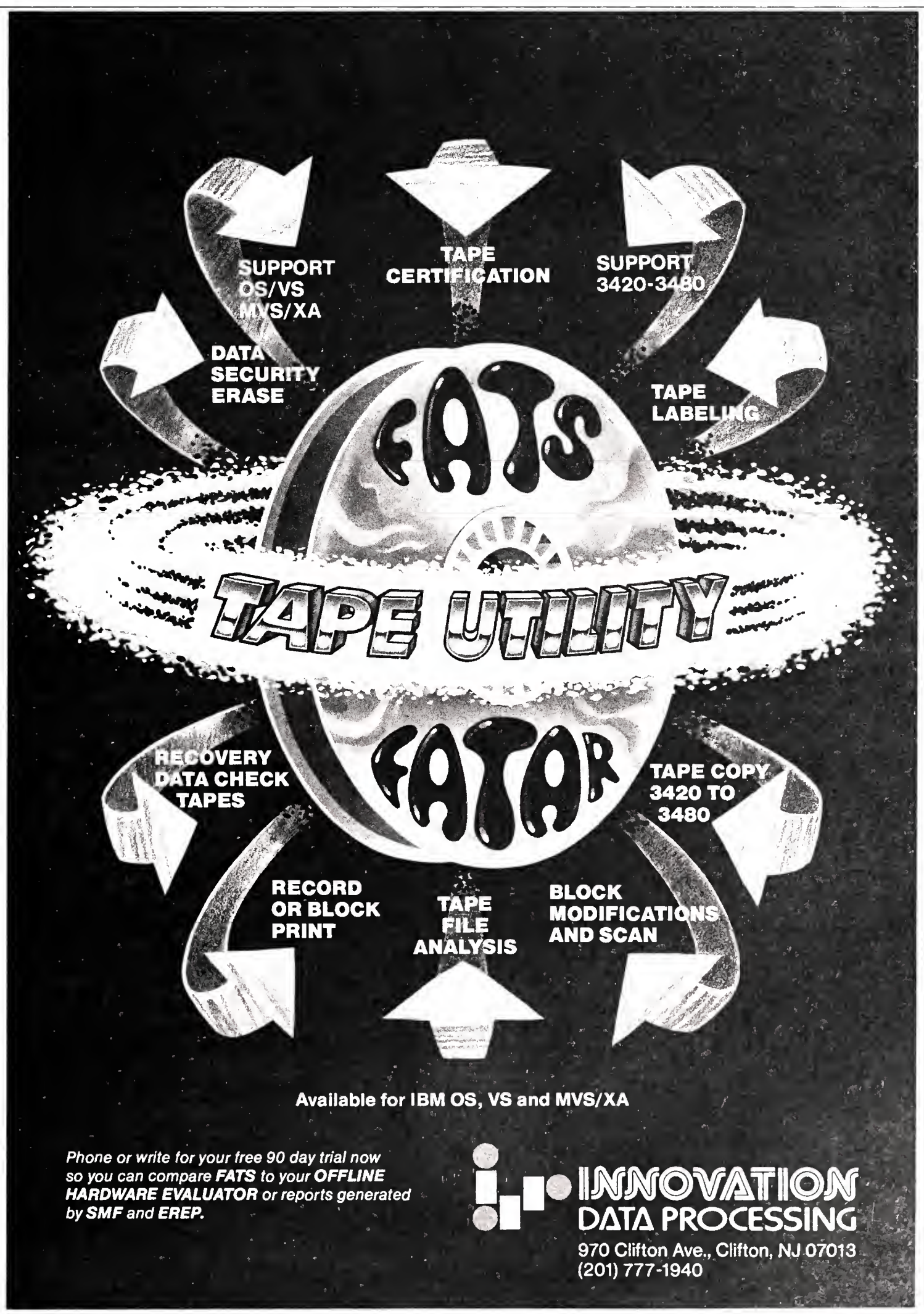
A staff of nearly 400 editors and reporters, along with news bureaus in Boston, Paris and Tokyo, will provide daily worldwide coverage of the computer industry.

Accessed with micro, modem

Based out of the CW Communications corporate headquarters in Framingham, Mass., the service will be available to subscribers on a selective basis in January and can be accessed with a personal computer and modem.

The communications software required to access the service, included as part of the subscription fee, will be custom-designed for individual systems to assure simplified access and automatic logon.

The CW Communications international editorial department said individuals may sign up immediately and that additional details on charter memberships and trial offers can be obtained by calling, toll-free, (800) 343-6474 or (617) 879-0700 in Massachusetts.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AT&T launches IBM 3274-type controller, peripherals

Multihost access, micro support emphasized

By James Connolly

NEW YORK — AT&T last week launched a new drive into the IBM 3270 market, emphasizing multihost access and personal computer support with the release of an IBM 3274-type controller and related peripherals.

AT&T Information Systems said its 6500 Multifunction Communication System, based on the 6544 Multifunction Communication Controller, will allow a single 3270-compatible terminal to access information stored in up to three 3270-compatible host computers or 16 asynchronous hosts and to display the information in four windows. The 6544 is said to support up to 32 terminals using unshielded twisted-pair wiring and coaxial cable.

Also announced were five 6500 series terminals, a color dot matrix printer and microcomputer adapters.

The 6500 product line replaces AT&T's existing 4540 and E4540 line of IBM-compatible terminals and controllers, which had been manufactured by AT&T's Teletype Division until that division was absorbed by AT&T's Computer Systems Division. An AT&T spokesman said 4540 terminals can be used with the new controller but that new terminals cannot be used with the earlier controllers.

Products competing with IBM

John King, a consultant with the James Martin Group, said the AT&T announcement is another step in its effort to provide a broad range of products, particularly products that compete with IBM's line. But he added that it will have more of an impact on the likes of Telex Corp., Memorex Corp. and ITT than IBM. "AT&T is just another alternative to IBM, and AT&T has a very large sales force out there," he added.

Voicing disappointment at the announcement, analyst Ilene Goldman of Framingham, Mass.-based International Data Corp. said the AT&T products appear to mimic those of other plug-compatible peripheral vendors like Lee Data Corp. She cited delays in AT&T's scheduled deliveries for some capabilities, such as support for IBM's Systems Network Architecture, which AT&T plans to deliver in February. Also planned are a protocol conversion module and an X.25 interface module scheduled for June delivery and the Single Session PC Adapter set for third-quarter 1986 delivery.

Among the terminals introduced is the 6539 Multitasking Display, a 14-in. color display with multitasking window management supported by AT&T's Video Co-Processor microchip. It emulates the IBM 3270 Models 2, 3, 4 and 5 and the Digital Equipment Corp. VT220. Other terminal introductions include the 6538 Multitasking Display, a 15-in. monochrome display with the equivalent features of the 6539; the 6529 Standard Display, a 14-in. color display with single-session emulation of the 3270 Models 2, 3, 4 and 5 and of DEC's VT220; the 6528 Standard Display, a 15-in. monochrome version of the 6529; and the 6518 Basic Display, a 12-in. monochrome display for IBM 3178 emulation.

AT&T also announced its Single Session PC Adapter and supporting software, designed to let the AT&T 6300 and 6300 Plus and other personal computers running Microsoft Corp. MS-DOS work as PC 6500s or IBM 3270 Personal Computers with 3270 emulation and single-host synchronous access. The adapter card is an Irma card licensed to AT&T by Digital Communications Associates, Inc.

The company also introduced the AT&T 6571 Color Graphics Printer and 6561 Printer Controller. The printer is a 400 char./sec. dot matrix color printer.

AT&T said a typical cluster of eight basic displays, six standard monochrome displays and two printers connected to one synchronous host costs $41,020. A multitasking, multihost configuration consisting of eight monochrome multitasking displays, six color multitasking displays and two color printers costs $58,620.

The basic 16-port, bisynchronous 6544 controller, priced at $7,880, will be available in December. Additional functions can be added by installing add-on modules such as the Synchronous Host Module for $2,400 and the Synchronous Device Interface Module for $3,920.

Software AG raises sights

From page 1

to IBM's Profs, based on their concurrent pilot tests of the two office systems. They said Con-Nect's document handling and data access facilities were difficult to use, but lauded Software AG's intentions to enhance the product with support for IBM communications standards and to make Con-Nect available on non-IBM machines.

With the unveiling of Con-Nect, Software AG becomes the first major independent software vendor to offer a mainframe office system on the scale of Disoss or Profs. Con-Nect runs under IBM's major operating systems on mainframes, a territory that has long been staked out by Profs and Disoss.

Product manager David Miller told *Computerworld* that Con-Nect will coexist with rather than compete against IBM's offerings in the office software mart. "We also have no intention of replacing" Personal Computer-based office products, he said. "We are striving to give MIS managers a way to provide these capabilities within the control of the MIS department."

Con-Nect allows users to merge data stored in Adabas into documents through Natural procedures — a facility the two beta users said was difficult for inexperienced users to handle. The system can also be accessed from a microcomputer through Software AG's Natural/Connection link. That capability allows micro users to participate in the host-based electronic mail network and to store and access documents in Con-Nect.

The document handling facilities, which users said required at least rudimentary knowledge of Natural, support editing, retrieval and storage of large documents. Documents can be stored by key words to allow for logical searches of the document archive. Schedule management acts as an electronic calendar for individuals and groups, and the electronic mail facility supports the creation, viewing, tracking and transmission of mail and messages.

Con-Nect costs between $30,000 and $40,000, depending on operating system. In addition, a user without Natural and Adabas would have to lay out $30,000 to $60,000 for the fourth-generation language and a minimum of $106,000 for the DBMS to implement Software AG's office solution. To tie micros into the Con-Nect network, a user will have to pay between $20,000 and $30,000 for the mainframe portion of Natural/Connection and between $200 and $1,000, depending on quantity discounts, for each micro portion purchased. In comparison, Version 2 of Disoss/370 has a monthly charge of roughly $1,335.

Miller said Software AG intends in mid-1986 to release a version of Con-Nect that supports IBM's Document Interchange Architecture (DIA) and Document Content Architecture (DCA). That support will allow for document transfer between Con-Nect and other office systems supporting DIA and DCA, including Profs, Disoss and the increasingly Disoss-compatible offerings from mini manufacturers like Data General Corp. and Digital Equipment Corp. He said the firm will also likely supply a DEC-compatible version of Con-Nect that will work with the currently available DEC VAX-based Adabas.

Two beta sites, Central Hudson Gas and Electric Co. in Poughkeepsie, N.Y., and Commercial Union Insurance Co. in Boston, are currently testing Con-Nect against Profs.

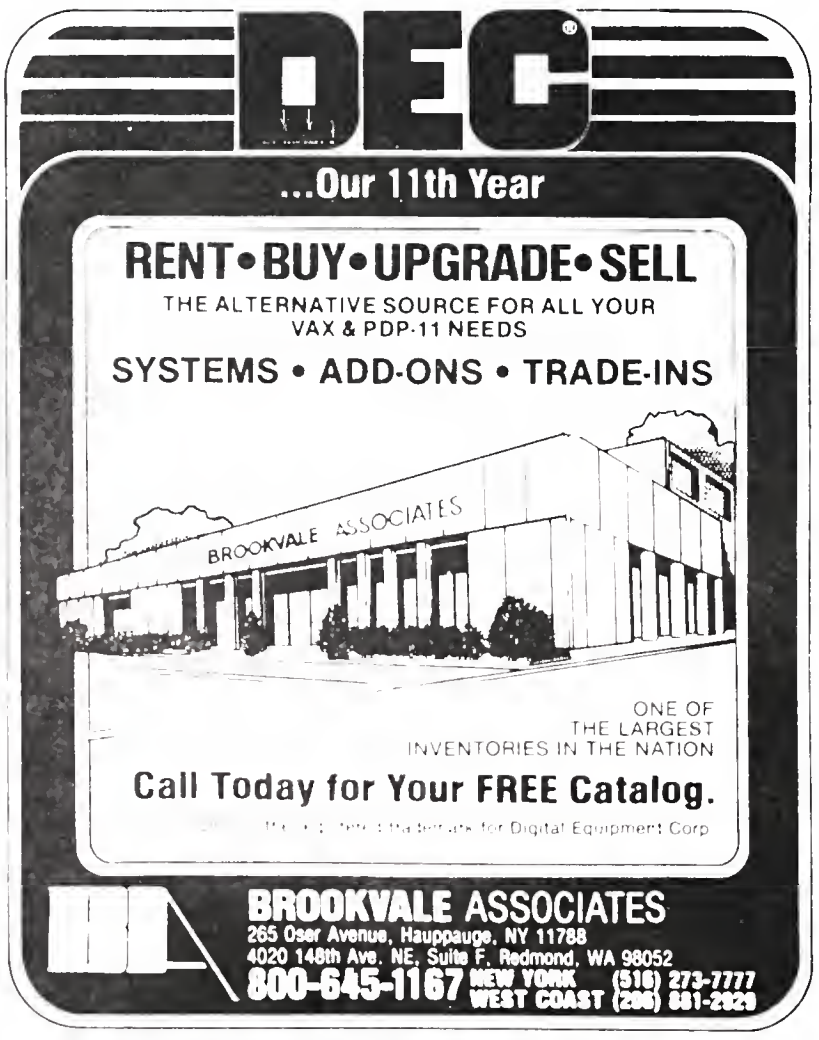
"Neither product has an outstanding group of features that the other doesn't offer," said Carlo Scagnelli, data base administrator with Central Hudson Gas and Electric. The company has used Con-Nect since August on an IBM 4341 processor under MVS. "We have found that Con-Nect is somewhat easier to learn and some of the facilities are easier to understand and handle. But when you add everything up, it's pretty much a wash, with the ease-of-use edge going to Con-Nect.

"The most important difference between Profs and Con-Nect," Scagnelli continued, "is that Profs already has some document interchange capabilities with other systems. But Con-Nect has a direct link into a DBMS, which Profs does not."

According to Richard Wolverton, director of data base services at Commercial Union, which has used the product since August on an IBM 3083 under MVS/XA, the availability of Con-Nect in a variety of environments is a plus.

"One of the things that has intrigued us," he said, "is the potential of running Con-Nect in a number of environments and communicating among them. We may run it under VM and MVS/XA and have people sending documents between those environments without having to log on and off. We are already running Adabas under [DEC's] VMS, and a VAX version of Con-Nect would tie everything together and give us one standard interface."

Neither company has decided whether to bring Con-Nect into its production environment.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WORLD DIGEST

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MUNICH, West Germany — The West German information technology industry continues to register strong growth. According to a recent trade report, the industry's total production rose to $3.1 billion during the first six months of 1985 — an increase of 20.4%.

The report revealed that the production of DP equipment rose by 20% during the first half of 1985, compared with the same period a year earlier.

HONG KONG — The trial run of Easypay, an electronic funds transfer at the point-of-sale project involving 29 major banks and 117 retail outlets here, has successfully managed more than 250,000 transactions since June, and plans are in the works to expand it, supporters said. According to Electronic Payment Services Co., the company commissioned to run the service, the 278 terminals on the Easypay network spent a total of 16,920 minutes — 282 hours — connected to the host in August alone.

Shoppers who use the system can pay using either credit or debit cards, the latter identical to cards used for transactions on automated teller machines. The shopper validates the transaction by entering his personal identification code on a small keypad linked to the terminal. Data from the card's magnetic strip is encrypted and routed from the terminal to the shopper's bank through a Tandem Computers, Inc. system acting as the switch. There, the customer's charge account is debited, and a credit is issued to the store's account.

LONDON — British Telecom International has been ranked No. 2 among the top 500 European corporations most desirable to invest in, according to a list published recently in the *Financial Times*, a British business newspaper. The ranking places the firm above third-place British Petroleum and comes as something of a surprise since British Telecom was only privatized by the UK government last year.

IVREA, Italy — Ing. C. Olivetti & Co.'s M 24 personal computer has won the 1985 Best Business Micro Award from the United Dutch Publishers. The award, given annually, cited the machine for its ergonomic design, processing speed and price/performance.

CANBERRA, Australia — Australian vendors involved in a soon-to-be-announced federal government contract for the Department of Aviation are complaining that the bulk of the $15 million order is going to Digital Equipment Corp. and only very small portions — worth about $500,000 — have been awarded to two Australian companies. Sources reported that the Australian computer industry claimed the contract will demonstrate that the government's preference policy, which was intended to promote Australian products, has not worked.

Justice Department takes issue with privacy bill

By Mitch Betts

WASHINGTON, D.C. — The U.S. Department of Justice last week objected to portions of a computer privacy bill on grounds that it would make it too burdensome for law enforcement authorities to intercept or obtain electronic mail and data communications messages during criminal investigations.

At a U.S. Senate subcommittee hearing, a department spokesman commented for the first time on the Electronic Communications Privacy Act of 1985 (S. 1667). It would outlaw the interception of electronic mail and other digital messages and provide rigorous procedural hurdles before law enforcement authorities could obtain the messages.

James Knapp, a deputy assistant attorney general, said the extra procedures — the same ones required now for police wiretaps of telephone conversations — are too burdensome to be applied to computer transmissions. Under questioning by Sen. Charles McC. Mathias Jr. (R-Md.) and Sen. Patrick J. Leahy (D-Vt.), Knapp said the procedural steps "would seriously impede law enforcement."

Knapp said that the computer privacy bill, sponsored by Leahy and Mathias, would require law enforcement agents to use a complex process to get approval from high-level Justice Department officials before obtaining a court order.

Knapp repeatedly argued that government agents already must obtain a court order to search electronic mail systems and that this less rigorous procedure is sufficient. He said that it is the same procedure used for regular mail and that electronic mail deserves no greater protection than regular mail — and perhaps less.

"The search warrant is more than adequate protection for your privacy," Knapp said, referring to electronic mail messages.

The general outlines of the bill were supported by the Electronic Mail Association, the American Civil Liberties Union and the Association of Data Processing Service Organizations, Inc.

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DP staff victim of corporate cuts

From page 1

was more and more duplication," said Michael N. Granieri, AT&T Information Systems spokesman.

'We're going through a bloodbath'

At General Foods, recently acquired by Philip Morris, Inc., staff cuts have reached deep into the MIS ranks. A staff of 700 in White Plains, N.Y., will be reduced 20% to 560, according to one top-level MIS insider. "We're going through a bloodbath. MIS is the first, and I think it's getting the hardest hit," he said.

Robert McKinney, director of information systems at Union Carbide in Danbury, Conn., said a staff of 140 will be pared to 100 at headquarters, with development taking a harder hit than operations. He declined to comment on cuts throughout the company, but a nearby placement director said Union Carbide's MIS staff of 500 will be reduced by 28% to 360.

Among those most affected, experts said, are managers who themselves have tolerated a high turnover rate.

Robert E. Lindsey, a placement specialist in Colorado Springs, tells of an upper level MIS manager in the Midwest who said several months ago that he felt comfortable in his job because his staff exhibited a normal 10% to 15% annual departure rate. "Three weeks ago, he called me to say he had been terminated," Lindsey said.

Thus, for some MIS people, a new and less secure outlook is taking hold. Particularly sensitive are those in such troubled industries as heavy machinery, farming, energy, computer memory chips and, in some instances, pharmaceuticals and chemicals.

"In Colorado, the economy is made up of agriculture, energy, high tech and services, and the first three are not doing well," said Marv DeSelm, manager of the United Bank of Denver's business services group. The Denver institution has cut back employees 6% to 7%, including MIS, he said.

> *'MIS has been more or less spared in the past. It's not being spared any more.'*
>
> **— Herbert Z. Halbrecht, Halbrecht Associates**

Cutbacks are taking place in old manufacturing companies in cities such as Cleveland and Detroit and in the former oil boomtown, Houston, placement directors said. James Fleming, a placement manager at Robert Half of Houston, Inc., said he has only 25 jobs waiting to be filled, compared with the typical 300 positions in 1982.

"Openings are very specific, and companies are hard to deal with. They want exactly the right qualifications," Fleming said.

Reports from other Robert Half offices indicate each region is experiencing the cutbacks in its own way. In New York, the reductions have occurred on a spot basis in the pharmaceutical, broadcasting, chemical and, in some cases, manufacturing industries.

"We had a tremendous influx of people over the summer. Since September, however, the number of job openings has been as high as ever," said Joan R. Bernstein, manager of data processing placement for Robert Half of New York, Inc.

With their more varied economies, New York and Boston appear better able to reabsorb terminated MIS professionals than oil- and agriculture-based communities.

"Most of our banking, insurance and financial services industries are adding to their staffs as we approach the holidays. Normally, you don't see that," said Frank R. Goldschmidt, DP placement manager for Robert Half Accountants in Boston. The only exception, he said, is the high-technology industry itself, which is still trimming.

Regardless of where the cuts come, however, they are experienced on an individual basis.

It is hard to export MIS professionals from Houston, despite the poor job climate, because they do not want to sell their homes in the city's depressed real estate market, Fleming said.

Companies in parts of thriving Northeast cities like New York no longer want to pay travel and interview expenses to people from the Southwest or Midwest because there is enough talent available in their immediate areas, placement officials said.

Left MIS to go back to the farm

"One $75,000-a-year manager took close to a year to find another job," Lindsey said. "I know three MIS people who went back to farming," the Colorado Springs placement officer added.

Even when they find new jobs, displaced MIS personnel can find the going tough. Herbert Z. Halbrecht of Halbrecht Associates, Inc., an executive search firm based in Stamford, Conn., said it is easier to find a job for a highly paid star of a company than for middle-aged, middle managers making $50,000 to $55,000.

"After a middle manager has been out of work for six months and his spirit is broken, he'll take a job in the $40,000" range, Halbrecht said.

A. Lance Zaremba, a computer security specialist, spent 20 years with the New Jersey pharmaceutical giant Hoffman-LaRoche, Inc. before getting the ax in a February cutback. He spent three months looking for another job, then found one as a software quality assurance engineer at ITT.

Less vacation, no bonus

While the base salary is similar, he misses the five weeks of vacation, which was trimmed to one day at ITT, and he no longer qualifies for a bonus that was equivalent to six weeks of his salary. "In effect, I took a cut," he said.

Most terminated MIS professionals eventually find jobs, and they find them quickly if they happen to be RPG-III programmers, needed by companies moving up to the IBM System/38 from the System/34 and 36, Bernstein said. CICS programmers are still in demand, as are people who can manage the micro-to-mainframe link.

DP auditors "are very hot," Bernstein said.

But most of the people let go do not have these skills. "Unfortunately, many older people are used to one system. Their shop isn't state of the art. And they can be replaced by someone at the same skill level for less pay," she said.

Being cut or replaced is something that many MIS staff members are psychologically unprepared for, particularly middle managers who have given much to the company and have rarely seen a colleague dismissed. But that situation seems to be changing.

"MIS has been more or less spared in the past. It's not being spared any more," Halbrecht warned.

■

Ford's planned cuts exclude MIS

NEW YORK — Cutbacks in MIS, along with general staff cuts that are sweeping major U.S. corporations, may be ill advised, if the Ford Motor Co.'s approach pays off.

Like the major corporations of Du Pont E. I. De Nemours & Co., Eastman Kodak Co., Union Carbide Corp., General Foods Corp. and CBS, Ford wants to reduce its payroll to help it stay competitive, and it is working toward staff reductions of 20% by 1990.

But instead of being allowed to shrink, the MIS department at Ford is growing, according to a Ford spokesman. "Our management sees MIS as critical to corporate objectives. . . . We look on information systems and information technology as major areas of competition among auto manufacturers around the world," said Jerry Peterson, manager of worldwide systems planning at Ford.

Orders 90% of parts by computer

Ford is already ordering 90% of the parts for the cars it builds through a computerized order entry system and wants to push the total to 100%. With computerized ordering, it is easy to get an update on the status of a shipment, which in turn helps "just-in-time" delivery to the factory floor.

Ford has invested extensively in computer-aided design and manufacturing and will continue to do so in order to speed innovation and product development, Peterson said.

"We see increased attention in office automation. Very few areas impact our cost/performance ratio as much as white-collar automation," he noted.

Ford is trying to tie together robots and automated sections within a plant to achieve greater computer-integrated manufacturing, he said.

"Part of our future success will depend on how successfully we can use this technology," Peterson said. Ford employs 5,500 people in MIS worldwide, and that number will continue to grow as long as corporate executives believe there will be productivity gains as a result, he said.

— Charles Babcock

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ORACLE now available on the IBM System/88

MENLO PARK, CA, November 4, 1985 -- IBM will be selling and supporting the ORACLE relational database management system (DBMS) on the IBM System/88 line of fault-tolerant computers, it was announced today. ORACLE is compatible with IBM's mainframe database management systems, SQL/DS and DB2. This compatibility allows applications written for SQL/DS or DB2 to run on the System/88 under ORACLE.

Oracle Corporation President Larry Ellison said, "We are very excited about this agreement, and are 100% committed to making our relationship with IBM an enormous success. We have always worked hard to maintain compatibility with IBM's DB2 and SQL/DS products."

Oracle Corporation, founded in 1977, produces and markets the ORACLE relational database management system, fourth generation software tools and decision-support software. In 1979 Oracle introduced the first commercial SQL-language DBMS. Today ORACLE runs on a wide range of computers, including IBM mainframes, DEC, DG, HP, Stratus and most other minicomputers, and a wide variety of microcomputers, including the IBM PC/XT and PC/AT. ORACLE runs under most operating systems, such as MVS, VM/CMS, VMS and AOS, as well as UNIX and MS/DOS, and several others. The System/88 is the latest entry to the list of ORACLE-supported systems.

Oracle Corporation distributes its products through a worldwide network of 30 direct sales offices. In addition, ORACLE is sold by IBM on the System/88, and by other computer manufacturers, including Sperry, Stratus and Honeywell. Today, 39 of the top fifty multi-national corporations use ORACLE.

For further information, contact Oracle Corporation, 2710 Sand Hill Road, Menlo Park, CA 94025.

ORACLE

1-800-345-DBMS

Manpower adds IBM System/36 to temp training repertoire

By Rosemary Hamilton

Manpower International of Milwaukee, the temporary help service that has been training its workers on dedicated word processors and IBM Personal Computers, is bringing the IBM System/36 into its repertoire.

Calling it a "major move to the next rung on the ladder," Manpower President and Chief Executive Officer Mitchell Fromstein told *Computerworld* during a visit to Boston last week that he has purchased System/36 minicomputers, but would not provide specific details. The goal is to train Manpower employees in a multiuser environment.

Mitchell said the initial phase, involving the company's 100 largest regional markets, will cost Manpower approximately $5 million, including hardware and training materials.

"We see IBM as concentrating on the System/36," Fromstein said. "This will enable us to serve the entire automated office environment."

The temporary help service, which said it has more than 700,000 employees worldwide, jumped into the high-tech world three years ago. Since then, about 100,000 Manpower temporaries have been trained in word processing and such common Personal Computer applications as the 1-2-3 spreadsheet from Lotus Development Corp.

The move into the System/36 arena will give Manpower temporaries the opportunity to learn communications and graphics software applications as well as data base management, Fromstein said. "Then we'll be able to send commandoes out there," he said.

The company has dished out about $12 million for word processing equipment and IBM Personal Computers, according to Fromstein. Every office, he said, has at least two pieces of equipment.

Manpower, which had sales last year of $1.25 billion, has poured millions of dollars into hardware and training to stay ahead in the temporary help market, Fromstein said. "Office automation surfaced three or four years ago in our strategic planning," he said. "When we realized what was going to happen, it made our blood run cold. We were sitting there with a work force of close to a million, and the closest most of them came to OA was an electric typewriter."

Departing from the traditional methods of training workers on computer hardware — in classrooms and with user manuals — Manpower developed a system based on a series of training diskettes called Skillware.

The purpose is to cut out the technical jargon that can scare off any novice. This technique, according to Fromstein, can transform any worker into a word processing operator or a skilled 1-2-3 user in one day.

TOP OF THE NEWS

NEWS from page 1

nounced sometime during the beta test period, ADS/Batch will allow users to develop batch-oriented applications interactively using the same command language as Cullinet's ADS/Online on-line system development tool. The product was demonstrated to several hundred users at the company's recent user conference in Boston. It is a complete rewrite of a similarly named Cullinet package released in 1980.

■

Look for a Comdex/Fall introduction of management support software from Charles River Data Systems, Inc. for its entire line of 32-bit AT&T Unix-compatible processors. Tentatively dubbed Workcenter, the software reportedly will include a spreadsheet, word processor and a data base management system. No word on pricing yet.

■

Motorola last week said it will phase out a major portion of its dynamic random-access memory business. It will scrap its N-channel MOS 256K-byte dynamic RAM production, after only one year of volume production, limiting its 256K-byte work to higher density CMOS products. The company also will consolidate two wafer fabrication divisions into a new, Phoenix-based Integrated Circuit Wafer Manufacturing Group.

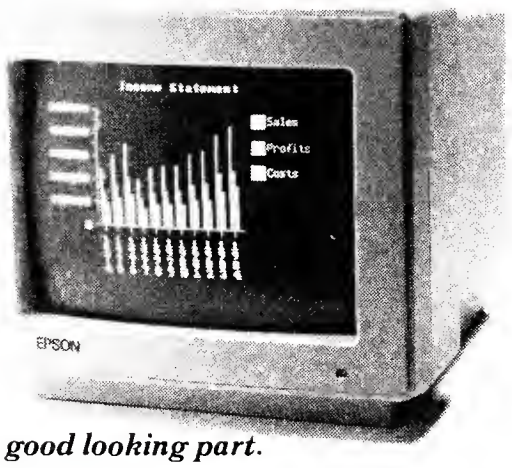
■

James Fiebiger will stay on as chief of Mostek Corp. in the Carrollton, Texas, semiconductor firm's new identity as a subsidiary of French electronics conglomerate Thomson-CSF. United Technologies completed the previously announced sale of Mostek to Thomson last week for $71 million. Fiebiger was named president and chief executive officer of Thomson Semiconductors, which will be a unit of Thomson-CSF, based in Rutherford, N.J.

■

On Tuesday of this week, U.S. Federal District Court Judge William Ingram will conduct a hearing on NEC Electronics, Inc.'s request for summary judgment in its long-standing dispute with Intel over NEC's alleged copyright violations of Intel's 8086 and 8088 microprocessors.

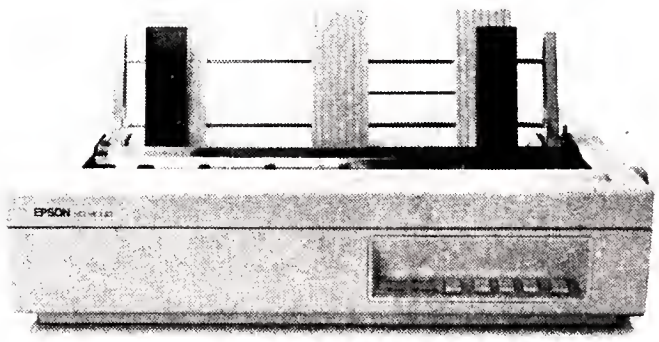
VAR PART.



A good looking part.

A small part.

A key part.



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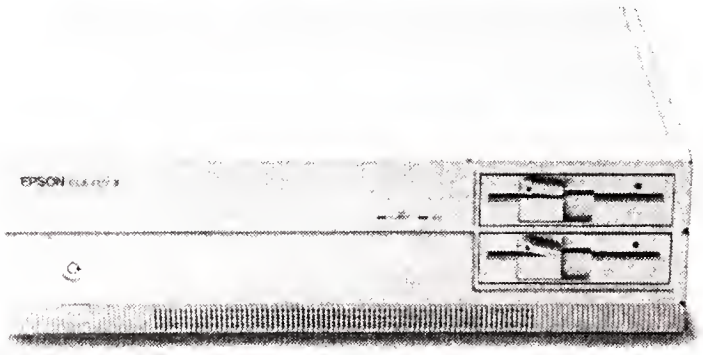

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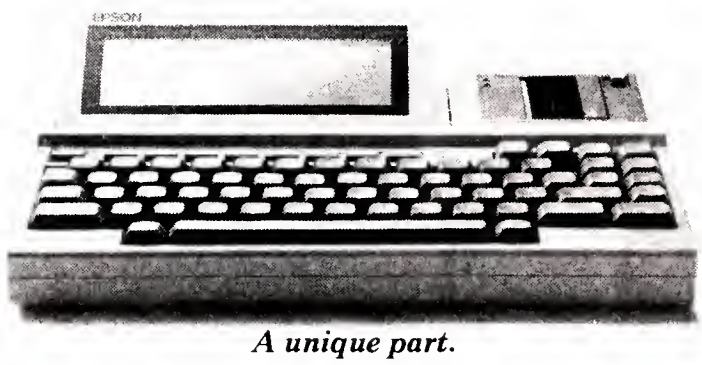

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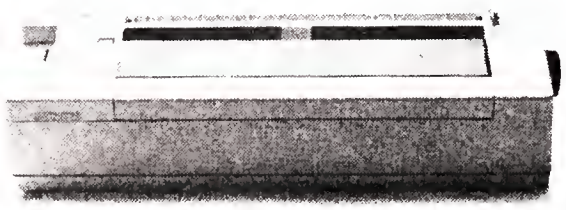

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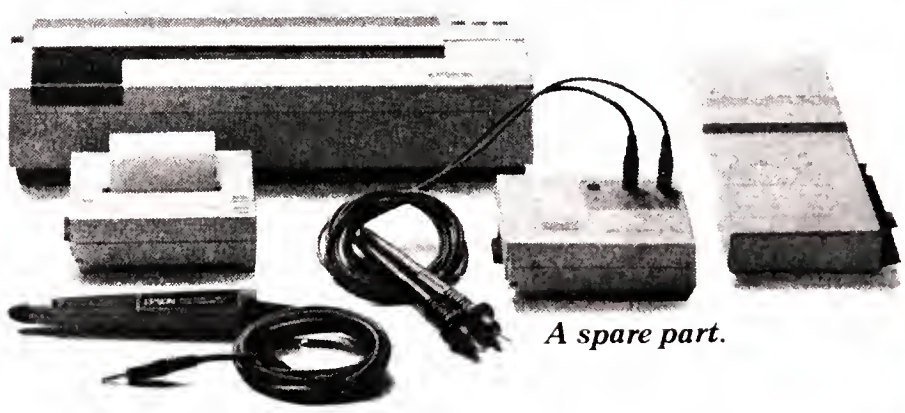

A spare part.

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Perkin-Elmer data group reborn as Concurrent Computer

By Charles Babcock

NEW YORK — Slicing off a fifth of the company, Perkin-Elmer Corp. last week spun off its Data Systems Group as a new company that it hopes will gain greater recognition.

Up to 18% of the new company, Concurrent Computer Corp., will be sold to the public in a stock offering, and 1% was sold to the management of the new entity.

"We have spent 10 years in the computer business, and we have to conclude that we at Perkin-Elmer are perceived as part-timers," PE Chairman Horace G. McDonell said.

The company's briefings for security analysts are typically attended by followers of the semiconductor industry who are interested in its semiconductor equipment business. PE also produces analytical instruments, missile guidance and optical systems, but when it gives a briefing on its computer business, the stock market analysts who follow the computer industry rarely attend, company spokesmen said.

In setting up Concurrent Computer, McDonell said PE was trying to draw attention to its leadership role in parallel processing and foster a more entrepreneurial spirit within its former Data Systems Group, the unit that produced its 32-bit superminicomputers.

"We have 3,000 people who are anything but part-timers and who deserve more recognition than they have gotten," he said. One person immediately gaining more recognition is James K. Sims, former general manager of the Data Systems Group, who was named president and chief executive officer of the new company. McDonell will remain as the chairman of the new firm.

At the moment, PE retains 99% of the stock of Concurrent, and its management is drawn exclusively from the ranks of the former PE Data Systems Group.

Little more than a name change

McDonell acknowledged that the creation of the subsidiary would amount to little more than a name change of a division except for the intent to sell more of the stock to the management and the public.

PE has agreed to sell up to 10% of the stock to the management for use as stock options over a 10-year period. In addition, the company plans to sell an additional 17% or 18% in a public offering to create public trading in Concurrent's shares.

For there to be public backing for its computer division, Concurrent "must be viewed as a pure player" rather than part of a technology company in a mixture of fields, McDonell said.

The former Data Systems Group had sales of $259 million and profits of $24 million in fiscal 1985. As Concurrent, it will have 3,100 employees, including a 1,600-person sales and service force. PE's total sales in 1985 were $1.3 billion.

PE's two computer manufacturing plants will be part of the new company. A 200,000-sq-ft facility is located in Oceanport, N.J., and a second, 80,000-sq-ft plant is located in Cork, Ireland. Concurrent headquarters will be in Holmdel, N.J.

Company spokesmen said PE currently has 23,000 installations of its computers worldwide.

The Data Systems Group began its existence as Interdata in 1966 before being acquired by PE in 1974.

■

Also last week, PE said first-quarter profits dropped to $14.5 million, or 32 cents per share, from year-earlier profits of $17.5 million, or 39 cents per share. However, the year-earlier figure included a nonrecurring gain of $4 million. Revenue increased 3% to $294.5 million from $285.9 million.

Industry urges policy changes

WASHINGTON, D.C. — The U.S. semiconductor industry has lost 54,000 jobs worldwide this year, according to an industry spokesman who urged the U.S. government to address the two problems at the heart of the decline: "unfair" Japanese trade practices and the cost of U.S. capital.

Michael Maibach, an Intel Corp. executive and representative of the Semiconductor Industry Association, told a U.S. Senate subcommittee last week that employment by U.S. semiconductor companies has fallen from 280,000 jobs in December 1984 to 226,000 last month, a 19% decline. He compared this with a 5% decline in related employment in Japan.

"The first problem we face as an industry is the lack of the 'rule of law' among trading partners," he said.

He said the remedies include U.S. access to the Japanese market, financial help for U.S. firms hurt by dumping and effective trade agreements.

The second major hurdle, Maibach said, is the cost of U.S. capital, which is almost twice the cost of capital to Japanese companies. Thus, the U.S. should enact tax reform and cut the federal deficit, he said.

— Mitch Betts

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EPSON

THE BEST PART

Apollo Domain boosted by Alliant server arrangement

As deal jells, Apollo exec Poduska resigns

By Donna Raimondi

CHELMSFORD, Mass. — Design and engineering systems vendor Apollo Computer, Inc. last week announced its intention to boost the power of its Domain network by adapting as central servers the recently released superminicomputers and low-end supercomputers developed by Alliant Computer Systems Corp.

Separately, Apollo founder and Chairman J. William Poduska Sr. resigned to start a new, unnamed high-performance workstation company that will sell to Apollo as an OEM. Poduska said the products, scheduled for delivery in early 1987, will run at 20 to 30 million instructions per second and will be compatible with Apollo's Domain system.

Apollo will offer Alliant's FX/1 minicomputers and FX/8 parallel low-end supercomputers as central compute servers to its Domain system. The arrangement will immediately provide Alliant with a large installed base to sell into, said Bob Herwick, senior analyst at Hambrecht & Quist, Inc., a leading technology-oriented investment banking firm. For Apollo, the deal opens up a higher range of the marketplace by providing more processing power required by large manufacturers, Herwick said.

> ”
>
> *'This is clearly a major contract for us.'*
>
> **— Ron Gruner**
> **Alliant president**

The Domain system consists of a network-based environment of interactive 32-bit computers dedicated to individual technical areas such as electronic or mechanical computer-aided design, manufacturing or engineering. The system provides two operating systems, high-level programming languages, a library of program development and productivity tools, third-party software and access to a variety of communications gateways and peripheral resources.

The Alliant, acting as a server, will significantly boost power for compute-intensive applications. An engineer doing finite element analysis, for example, can interactively design a product on a workstation, analyze the design on the Alliant compute server and access the results without changing the user environment or interface.

For young Alliant, founded in 1982, the development was a watershed, according to company President Ron Gruner, who added, "This is clearly a major contract for us." Alliant originally released its FX/Series in July and recently shipped its first FX/1 unit to an MIT laboratory in Cambridge, Mass. Apollo and Alliant have been discussing the nonexclusive agreement, for which Apollo will develop the necessary interfaces, for several months.

Apollo will handle the marketing, sales and service for systems linked by Domain. The announcement follows closely on the heels of Apollo's 15% purchase in Spectragraphics Corp., which will allow Apollo to open the IBM mainframe world to the Domain network, an Apollo spokesman said.

The Spectragraphics deal is an entry into the IBM 5080 color graphics terminal emulation arena, which is essential to getting large, end-user orders in the engineering and mechanical design world, analyst Herwick said. Rumors abound that the long-awaited IBM workstation will offer 5080 emulation, making it an important feature for vendors to have. The deals Apollo is making will allow them to capture a place in the very large markets like the automobile and aerospace industries, he added.

Poduska's new firm will develop workstations "priced significantly higher" than Apollo's current products. The machines, based on application-specific semiconductor technology, will integrate graphics with processing capabilities, Poduska said.

Poduska, who will retain his Apollo stock holdings, said he resigned from the Apollo board "to avoid any possible suggestion of a conflict of interest." Apollo President and Chief Executive Officer Thomas A. Vanderslice replaced Poduska as chairman.

Apollo retained investment rights for the new venture and the right to acquire it upon its initial public offering. Poduska may hire only six Apollo employees in the next three years.

Apollo also last week named Computer Consoles, Inc. Chairman and Chief Executive Officer John F. Cunningham to its board. Cunningham, once considered a candidate for the Apollo presidency, resigned as president of Wang Laboratories, Inc. earlier this year.

Staff members Clinton Wilder and James Connolly contributed to this report

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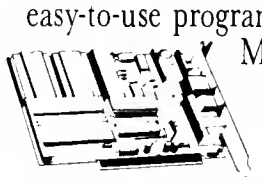

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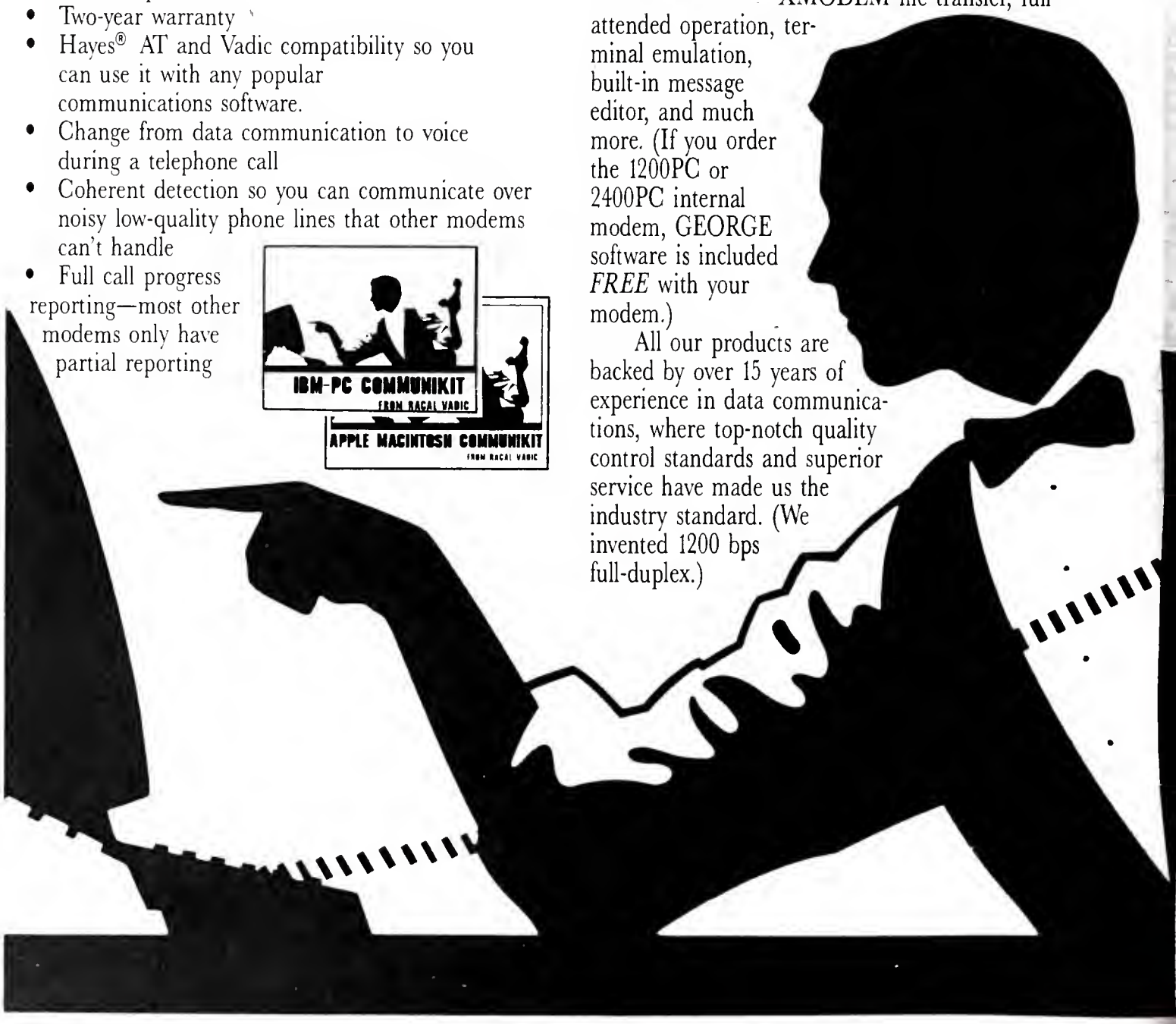

NEWS

FBI charges alleged software pirates as crackdown continues

Third in string of recent cases probed

By James A. Martin

LOS ANGELES — In what appears to be a mounting effort by federal authorities to crack down on the flow of pirated software, the Federal Bureau of Investigation said last week it uncovered evidence that two individuals illegally reproduced and sold an undisclosed amount of personal computer software programs.

The FBI's evidence is to be turned over to a federal grand jury, a spokesman said, and indictments will most likely be forthcoming.

This is at least the third such case in recent months in which the FBI has probed allegations of software pirating. In October, the FBI said, it investigated a scientific publishing firm in Philadelphia for reportedly pirating a typesetting software program [CW, Oct. 14]. Also last month, an FBI probe in San Francisco resulted in a five-count indictment against an individual who allegedly reproduced copies of a court reporting software program [CW, Oct. 28].

Software vendors and distributors are understandably pleased with the recent increase of federal investigations into pirating and the resulting indictments. David B. Sturtevant, senior director of public communications for the Association of Data Processing Service Organizations, Inc., said the probes indicate that federal law enforcement officials "now recognize this as a pervasive problem in our society, an economic problem that has the potential to eat at the roots of a very important sector of our economy."

The FBI executed search warrants on Oct. 31 against Morris Shainberg of Computer Software Consultants, Inc. and Gregory Allen Howard of Lowry Communications, according to Richard T. Bretzing, special agent in charge of the FBI Los Angeles office, in a prepared statement. Computer equipment, illegal copies of software programs and any other evidence were confiscated by the FBI. All evidence will be turned over to a federal grand jury for consideration of indictments, Bretzing said. He would not say when any such indictments or judicial action might be expected.

Shainberg and Howard had used several corporate and individual aliases while allegedly selling the pirated software. The FBI would not say if the names and companies given were authentic.

According to Bretzing, Shainberg and Howard had sold illegal copies of Ashton-Tate's Dbase III and Framework; Lotus Development Corp.'s 1-2-3 and Symphony; Computer Associates International, Inc.'s Easy Business System program; and "a number of other popular" IBM Personal Computer programs.

The pirated copies were being offered for as little as $125 through a series of *Los Angeles Times* classified advertisements during the late summer months.

A spokesman for State of the Art, Inc., a Costa Mesa, Calif.-based accounting software manufacturing and licensing firm, said several "duped end users" called the company to complain about what they assumed were software programs from State of the Art.

From that, the company launched a private investigation "to determine who was behind the pirated software," said David Samuels, president. The investigator then turned over all evidence to the FBI. Computer Associates had also been conducting its own probe when contacted by the FBI, according to Betzing.

Betzing said most piracy cases involve personal computer users making extra copies of software programs on floppy disks for friends. "That kind of piracy is costly to the software industry but is difficult to prevent or prosecute," he said.

Copyright infringement and unauthorized distribution of software and misdemeanor indictments are expected, which carry maximum penalties of one year in prison and/or a $1,000 fine. But Samuels indicated felony charges might be forthcoming as well, such as unlawful trademark violation. The FBI would not comment.

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Honeywell OEM inks DPS 6 deal

EAST HANOVER, N.J. — Ultimate Corp., Honeywell, Inc.'s leading OEM customer, last week announced a $110 million OEM deal to incorporate Ultimate's coprocessors and software with Honeywell's DPS 6 superminis during the next three years.

The Ultimate 7000 series of 32-bit superminis will incorporate the DPS 6 and peripherals with the Spectrum Manufacturers Association version of Pick Systems' Pick operating system. Ultimate is a member of the Spectrum association.

The agreement is the largest OEM deal to date between the two companies, which have had an OEM relationship for six years.

Ultimate has sold more than 1,500 DPS-based systems in that time, according to a spokeswoman.

VIEWPOINT

EDITORIAL

Don't cut here

Early retirement, special severance deals, plain and simple layoffs — all have become common as companies respond to increasing competition by trimming staff ranks. What has not been common is an emerging trend: cutbacks, often as high as 20%, in data processing staffs (see story page 1).

Until now, MIS staffs had enjoyed something of a privileged position in this regard. Thanks to the high value placed on special processing and programming skills and the organization's dependence on computer systems, MIS was exempted from staff cuts in times of recession or declining business.

No longer. Instead we may be seeing a growing conviction among top management that computer staffs are bloated and must be the first to slim down. That is the apparent thinking at General Foods Corp., which has ordered MIS cuts before trimming elsewhere.

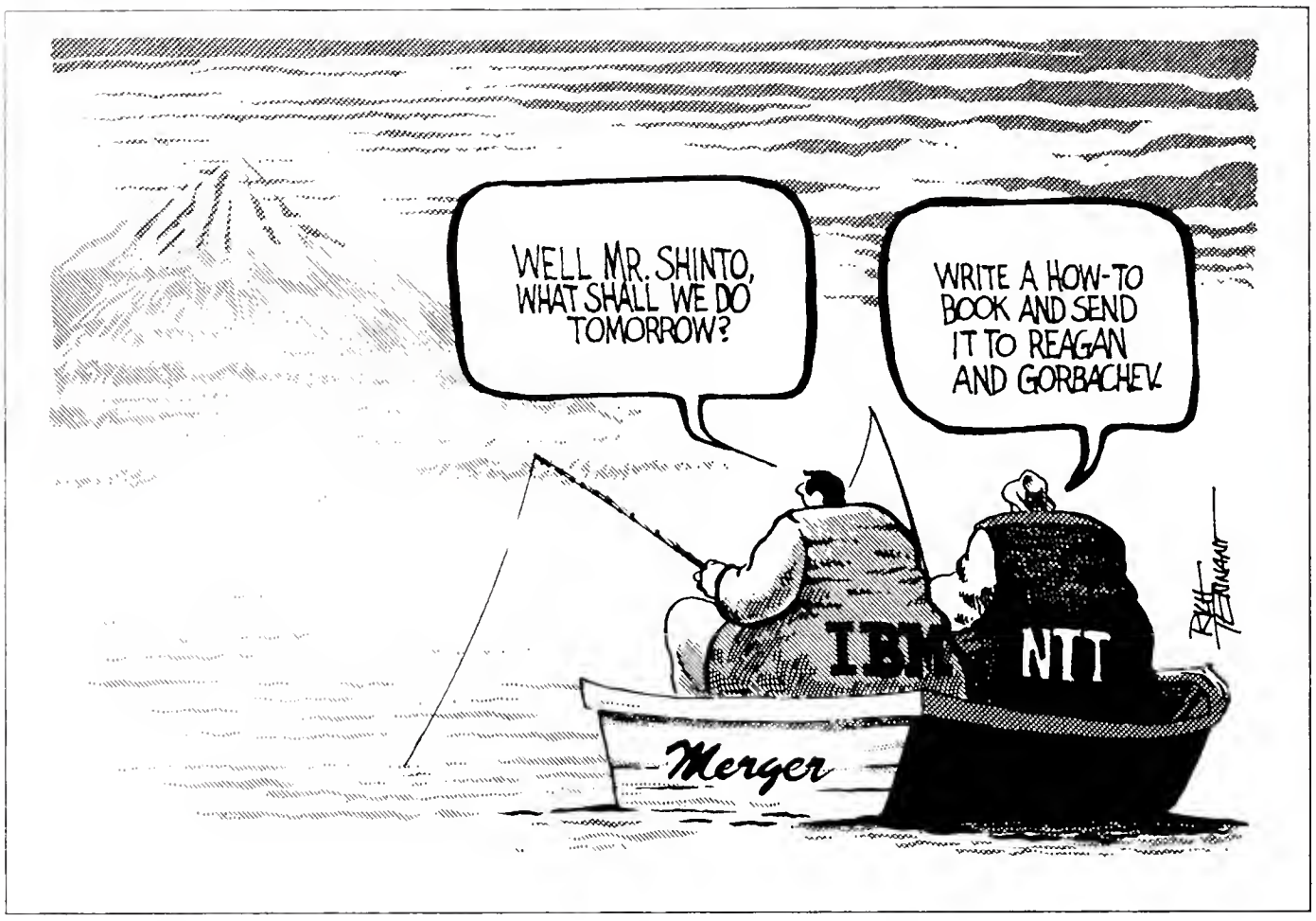
This is dangerous thinking. Bloat is one thing, but we doubt that there are many companies with enough fat in their data processing staffs to allow cuts of 10% to 20% without severely hampering their operations. It is axiomatic that information strategy decisions being made by corporations today are far more important than the data processing decisions they made 20 years ago and will largely dictate a company's commercial success for the next 50 years. Far-sighted firms accept this fact and manage staffs accordingly.

At Ford Motor Co., for example, the MIS staff is growing despite plans that call for the total number of Ford employees companywide to shrink 20% by 1990. Why? Because Ford management views information technology as a critical tool in its effort to boost productivity and compete aggressively.

MIS professionals must not sit quietly by as their departments are threatened with cuts so severe that remaining staff must make do with limited resources. Instead they must take a leadership role in the corporation's competitive battle. Part of the MIS charter is to educate management to the value of information technology — whether through pilot projects, position papers or quiet lobbying. At no time has that educator's role been more important.

Notes & observations

Once more IBM has struck while the coals were hot. In securing its recent connection to Japan's Nippon Telegraph and Telephone Corp. (see story page 1), Big Blue was taking advantage of the heightened trade frictions between the U.S. and Japan. This deal, which pairs the world's largest computer company with the world's second largest computer services company, has staggering implications for the global computer community. Five years ago, the Japanese government would most likely not have permitted such a joint "megaventure." But recent U.S. pressure on Japan to open up the Japanese telecommunications market to our exports induced Tokyo to bite its lip and stay its hand when IBM and NTT went courting. This sensitivity to the nuances of international politics allowed IBM to wield its political clout and far-reaching influence and then pull in yet another prize in its continued dominance of the world's computer industry. Just like the textbooks tell us to do it.



LETTERS TO THE EDITOR

Codd vs. Cullinane: Choosing sides in debate over relational DBMS

As a consultant who has worked with many users in the throes of deciding which data base management system to buy, I found E. F. Codd's two-part article "Is your DBMS really relational?" [CW, Oct. 14 and Oct. 21] to be a welcome relief in a world of misleading, if not downright false, advertising by some DBMS vendors. Every older nonrelational DBMS, except IBM's IMS, is claimed to be relational — having undergone a marketing metamorphosis rather than any appreciable technical change.

Clearly, there is no better person than Codd, the inventor of the relational model, to call attention to this sorry lack of truth in advertising and to provide a carefully thought-out set of principles by which to evaluate a relational DBMS. Codd's article should be used by every consultant, consumer and vendor in the DBMS world.

At the same time, it was disconcerting one week later to read John Cullinane's letter to the editor [CW, Oct. 28] attempting to discredit Codd's excellent article.

First, Cullinane's claims that the Cullinet Software, Inc. IDMS/R is a relational DBMS are clearly false. Second, although there is no reason why a fully relational DBMS cannot handle applications with severe performance requirements, present implementations cannot do so. However, IDMS/R also cannot handle applications with severe performance requirements: These applications are usually relegated to IMS Fastpath or TPS.

Third, the remark about a relational DBMS being unable to fly conflicts with the hundreds of existing authentic relational DBMS installations. Many of these out-perform IDMS/R in addition to providing a substantial increase in user productivity. Thus, Cullinane's airplane analogy is nothing more than a cheap shot and a misrepresentation of the actual facts.

Somewhere in the neighborhood of 90% to 97% of all applications can be, and are, supported by the transaction processing capabilities of today's authentic relational DBMS.

The term "nice" applied by Cullinane to relational technology was atrociously condescending. One might as well call the invention of the telephone, automobile and electricity "nice."

Finally, Cullinane's assertion that Codd's article was a "thinly veiled" attempt to bless IBM's dual data base strategy shows total ignorance concerning Codd's continual battle with IBM — about 15 years in length — while still an IBM employee. Attendance at Codd's lectures bears out that Codd has never supported or apologized for the dual data base strategy and does not now.

Codd's article obviously had one principal objective: to provide the data processing community with a method for evaluating relational DBMS products in a world where vendor advertising is all too confusing. Codd has achieved this objective and served us well.

Cullinane could serve the DP community better by turning his attention to more constructive activities, such as leading his company in the development of a new DBMS product that is authentically relational and dropping claims in Cullinet advertising and manuals that this release is a relational DBMS. In all respects — technically, professionally and especially ethically — Cullinane has been outclassed by Codd.

Joan Boroff
Surise, Fla.

■

E. F. Codd's two-part article on relational data base rules "Is your DBMS really relational?" [CW, Oct. 14 and Oct. 21] was a much-needed insight into the large gap that exists between true relational features and the "relational" models passed off by so many software vendors. John Cullinane's response to this article is a clear example of misinformation and sour grapes.

In his letter to the editor, Cullinane claimed that the Codd article stated that a true relational data base would not be able to handle applications with "severe performance requirements" [CW, Oct. 28]. The sentence in Codd's article that Cullinane quoted states "Only if performance requirements are extremely severe should buyers rule out present relational DBMS products on this basis."

Codd is clearly not referring to a true relational DBMS but to the current "relational" systems of which Cullinet Software, Inc.'s IDMS/R is a prime example.

If Cullinane truly believes relational technology is the technology of choice, then he must accept that Codd, as the originator of the relational model, is also the unchallenged authority on what rules define it.

Jeff Spalding
Altamonte Springs, Fla.

VIEWPOINT

The demise of general-purpose systems

By Charles P. Lecht

Normally, the bigger the bucks we spend, the more we want to be able to do with the things we buy. But, no longer is "more" the point when it comes to large systems; no intelligent data center manager should acquire a large system based on its capability as a general-purpose system.

The same is true for small and medium-size systems, but most of us find that notion easy to accept. In fact, however, with large systems as well as with smaller ones, primary consideration should be given to how well the system can fulfill *particular* needs now, how long it will do so and how easily it can be migrated from or upgraded to accommodate a change in needs.

When defining large systems, I purposely exclude those immensely powerful supercomputers that are found in special research laboratories and promise millions of instructions, floating-point operations and logical inferences per second. It is hard to envision the day when the power these systems provide could be made commercially available without rigid restraints on its usage. My definition also excludes the mammoth integrated services digital networks being created by virtually every major commercial and governmental power in the world.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

LECHT ON SCIENCE

Our largest commercially available computer systems — IBM's recently announced 3090 scalar and vector processors — bring more than 50 million instructions per second (MIPS) to companies with enough cash to acquire them and cannot help but astonish veteran users. A comparison of improvements in the MIPS available in large-scale computer systems shows a hundredfold improvement in the 1960s and only a fivefold improvement in the 1970s.

Now we are witness to a tenfold improvement in the first half of the 1980s. What this means is that the commercially available high end is undergoing a revitalization.

How are these systems used? Nearly everyone's list includes the following: information storage/retrieval, data base management, data space management (where data is located) and transaction processing, communications processing, robotics, graphics design, economic modeling, weather prediction, seismic analysis, plasma physics, nuclear physics, circuit design, fluid dynamics, structural dynamics and computational chemistry.

Applications covered by one or another of the above entries or a combination of these include the following: banking systems, management information systems, entertainment processing and computer-aided design and manufacturing.

In the data centers within which large systems find their use, both business and science applications are companions to a degree greater than in any other place computers are used. The list of specific names that are given to these are as long as the creative imagination will allow, but on close examination, most of them will be nothing more than different labels for the same applications identified above.

However, there is great value for both manufacturers and users in trying to create a list of things that large systems do that is irreducible and to search for common processing scenarios that may have widest application.

The difference between having done this and not having done it may well explain much of IBM's continued success in large systems manufacturing and sales. Those who manage large-scale data centers and find themselves paying ever-increasing software costs should take note. Their success — indeed, survival — may depend on how well they adopt this strategy.

The days when computer systems, small to large, are made and bought solely by the power they might provide if used on some undetermined application are over. An ever-increasing specialization — in large systems as well as in small and mid-size ones — is rushing toward us. For that we should be grateful.

Moving toward mandatory data security

By Sanford Sherizen

Laws, professional guidelines, insurance requirements and similar pressures stand to make corporate information security mandatory rather than voluntary. Most organizations will soon have no choice but to secure their data resources.

Already, corporations must enforce specific security procedures, sometimes as a matter of survival.

No company that uses purchased software, for example, can ignore the need to institute a security awareness program lest it come to trial for unauthorized software duplication. The existence of an active employee awareness program and a written policy statement, both of which indicate a firm's commitment to preventing duplication, offers a strong defense.

Organizations in regulated industries must institute other procedures as well, this time as a matter of federal and state regulation.

The U.S. Department of the Treasury and other regulatory agencies require certain banks and financial organizations, for example, to report certain problems of financial integrity and losses from computer crime. Increasingly, the Department of Defense insists that its contractors file risk analyses, and the Department of Health and Human Services requires Medicare providers to do the same.

In the near future, more regulatory, professional and commercial organizations will demand that their constituents, members and customers make specific security provisions. In turn, more companies will be held to mandates stating how information security should be structured and who will be held responsible if a preventable crime occurs.

Sherizen is a Natick, Mass.-based information security consultant and criminologist.

READER'S PLATFORM

Corporations that hope to prosper under the coming regulations should enter a general state of preparedness as soon as possible.

Most corporations will have to address the following four aspects of information security to abide by the new rules:

Protection. The ability to meet certain prevention standards, such as a security awareness training program, a set of physical and procedural security objectives and a strong program of password control.

Detection. The ability to audit and monitor systems to uncover computer crimes and abuses. This includes alerting low-level managers and other workers within the corporation to their responsibilities for detecting crime.

Prevention. The ability to establish the integrity of financial data and other systems through encryption, message authentication, built-in redundancies, testing and other techniques.

Reporting. The ability to press charges against computer crime. To win convictions, organizations must first convince their employees to admit that breaches occur and must encourage each worker to report any suspicious activity.

Corporations that hope to prosper under the coming regulations should enter a general state of preparedness as soon as possible. Firms that act now will be better able than their sluggish competitors to meet the inevitable.

To set in motion the preparatory process, managers should see that their companies take the following steps:

- Incorporate information security as part of the company's strategic planning process so that security measures are well coordinated with other strategic requirements.
- Make upper level managers aware that they are the people who will be held responsible for the development and adequate support of information security programs.
- Increase security awareness training and computer crime prevention programs to prepare end users for rules that might take effect.
- Do not wait for outside forces to impose information security standards and requirements; instead, define security measures from within.
- Start to choose specialized personnel to formulate a sophisticated information security program or to supplement any program that currently exists.

If top managers or end users doubt the need for these actions, the MIS manager or security director can substantiate the claim with a great deal of evidence. Many organizations have already brought pressure to bear on businesses' information security policies.

The federal government is in the forefront of requiring measures for the protection of information, especially in its legislative efforts.

Outside of the legislature, the government mandates security policies through organizations like the Defense Department and the National Security Agency (NSA). Both groups have a long history of upholding information security internally and within their contractors' shops.

They are currently expanding their sphere of influence by applying national security requirements to civilian agencies as well. Their efforts are a substantial peacetime attempt to apply security standards outside of the defense community.

National Security Decision Directive 145, which a committee headed by the NSA is currently putting into operation, stands as the cornerstone of efforts to expand the government's influence. The directive requires almost every government agency to uphold strict standards for information classification and for computer and telecommunications security.

The NSA said it plans to encourage any business that uses or supplies government data to abide by the directive. It said it hopes to see a ripple effect in other businesses until the security measures become de facto standards. Data processing organizations throughout the nation will feel the effects.

The computer industry and its professional organizations are also beginning to set specific security requirements. Members of the videotex industry are seeking computer crime laws and other protections.

NEWS

NIH puts bar codes, supermicro to test; slashes paperwork

By Mitch Betts

BETHESDA, Md. — Office automation and the Paperwork Reduction Act notwithstanding, there is still a lot of paperwork in the federal government.

No matter how much automation occurs inside an agency, documents and proposals from the public arrive at the government's doorstep in the form of paper. That is certainly the case at the National Institutes of Health (NIH).

According to Dr. Harold Waters, chief of the referral section of the NIH Division of Research Grants, the NIH gets 33,000 grant applications a year, each one an average six inches thick.

"We get documents that are more than a mile high, three times a year," Waters said. "That's mountains and mountains of paper, and until recently, we were a rubber band and paper clip operation."

To manage this bureaucratic nightmare, Waters is testing a new automated system that uses bar code technology and a supermicro to log and track each document. The product, appropriately called Paperflo, is a turnkey system from Infocel, Inc. of Rockville, Md.

Top line summary

Application: Document logging and tracking

Business: Health care research

User: National Institutes of Health

Using Paperflo, a bar code label is attached to each document and key information is logged onto an AT&T 3B2 base station. Each time the document gets passed to a different office, that office uses a bar code wand attached to a notebook-size workstation to register the document's receipt and then to record what action has been taken before routing it to the next office.

In a typical configuration — like at the NIH — 20 or so workstations are hard wired to the supermicro. The cost is about $75,000.

The supermicro uses the AT&T Unix System V operating system and proprietary software for a menu-driven, relational data base management system that can generate reports about the document flow.

So far, there are eight installations of Paperflo, in such applications as personnel records, purchase orders and hospital medical records, according to Infocel spokesman Christopher Grover. He said paper-intensive organizations and agencies handling very valuable or sensitive documents are the best applications.

At the NIH, Waters said, the system enables him to track not only the paperwork but also the decisions that have been made regarding particular applications and the productivity of the operation. Because each action is time stamped, the system tracks how much time a document has been sitting in one place, such as the printing office.

"If something is in there for 15 days or more, I get a list, so I know if something is stuck," Waters said. "By tracking it, I can go in and find it and shake it loose," he said.

Waters said the initial resentment among employees that "Big Brother is watching" has disappeared. "They are aware of the system, but mostly I've been complimenting people who get things moving rather than hassling people," Waters said.

NIH has a complex process for handling grant applications, beginning with an initial review by senior scientists, and then printing 60 copies of each proposal for final review, before the grant is approved. "It's the bar code that's helping us through this process," Waters said.

A big benefit of Paperflo is that when applicants call for a status check, the NIH employees can easily determine where the document is and what actions have been taken. "Instead of looking like dumb bureaucrats, we look like we know what we're doing," Waters said.

The productivity gains are especially important since the staff has been cut 30% in the last two years while the work load has increased 15%, Waters added.

Furthermore, the system does not require a great degree of computer literacy, and paperwork mistakes are virtually eliminated, he said. "It's just about as idiot proof as it can be," he said.

Five universities receive DP grants

By Mitch Betts

WASHINGTON, D.C. — The National Science Foundation recently awarded grants totaling $12.5 million to five universities to help establish and operate major computer research facilities.

Institutions receiving the National Science Foundation grants are the following:

- University of Massachusetts — Amherst ($4.7 million) for research in the areas of intelligent systems and distributed and parallel processing.
- University of Colorado ($3.2 million) for an experimental computational facility that will be composed of a loosely coupled network of scientific workstations.
- Princeton University ($2.2 million) for research on supercomputers with massive amounts of physical memory in the tens of billions of bytes.
- University of Minnesota ($1.5 million) for research using supercomputers to design and analyze algorithms and applications software.
- University of Washington (almost $1 million) for the study of distributed computer systems.

The grants were announced by National Science Foundation's Coordinated Experimental Research Program. All grants are for five years, except for the University of Washington grant, which is for two years.

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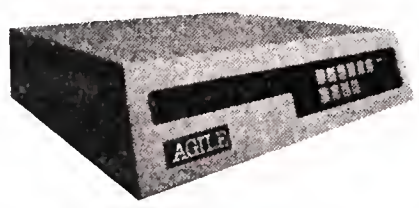

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COMMUNICATIONS

WIRE TAP
Daniel Minoli

Hiring staff: an artful skill

THIRD IN A THREE-PART SERIES

Hiring a data communications professional may be a million-dollar investment. Yet the decision is usually made after studying a resume and interviewing the candidate for only two or three hours. Before spending an equal amount on a communications system, a manager would probably conduct a comprehensive, time-consuming study, read voluminous system specifications and write sizeable reports.

Given this discrepancy, it comes as no surprise that the people eventually turn out to be the weak link in a large network environment.

Some time-tested human resource factors described below may help in choosing the best person for the job.

The tendency is to look at the most recent accomplishments and responsibilities of a prospective job candidate. Decision making is generally referential to the last position (if the candidate managed X people, now the candidate can manage X plus delta; if the candidate was paid Y dollars, now the candidate can be paid Y plus delta). While this is a very conservative approach, a selection based on this criteria may turn away potential talent and creativ-

See **HIRING** on page 26

Minoli is a member of the Bell Communications Research (Bellcore) network architecture planning group. Opinions in this column are strictly the author's and do not represent the view of Bellcore.

Octel touts voice mail system

Automated receptionist feature adds versatility

By John Dix

SAN JOSE, Calif. — An automated telephone receptionist feature has been added to Octel Communications Corp.'s voice mail system. The software option can be used on new or existing systems supporting Octel's standard voice messaging functions.

When outfitted with the Enhanced Call Processing software, Octel's Aspen or Aspen Branch systems answer incoming telephone calls with a recording asking the person to enter call-routing instructions.

Callers can be forwarded to an extension, leave a voice message or be routed to other Aspen message features, such as Information Center Mailboxes.

The Enhanced Call Processing software enables users to create custom voice menus to Information Center Mailboxes, which contain recordings of frequently requested information. A marketing department, for example, could prepare a series of recordings that give brief descriptions of its products and leave them in labeled mailboxes, Octel suggested. After hearing about products, callers could leave their name and number or be forwarded to a customer service representative.

If Aspen is used strictly for reception purposes, the caller would be instructed to use his Touch-Tone telephone to enter the desired extension. Callers with rotary phones or who are unsure of an extension will be forwarded to an operator. If the extension is busy, the caller is forwarded to the user's voice mailbox.

Enabling callers to route their own calls reduces the expense of having operators and department secretaries answer phones and transfer calls, according to Robert Cohn, Octel president and chief executive officer. The software feature is also less expensive than direct inward dialing, a

See **OCTEL** on page 25

MAP interface modules debut

By Paul Korzeniowski

SANTA BARBARA, Calif. — Advanced Computer Communications has announced the first set in a planned series of interface modules for General Motor Corp.'s Manufacturing Automation Protocol (MAP).

The company's family of Advanced Communication Processor (ACP) boards are based on a Motorola, Inc. 68000 microprocessor, up to 1M byte of random-access memory and 128 bytes of erasable programmable read-only memory.

The ACP 6180 and ACP 6480 are for use with Digital Equipment Corp. VAX superminicomputers and supply various levels of compatibility with the seven-layer MAP network model, which is based on International Standards Organization's (ISO) Open Systems Interconnect model.

The ACP 6180 supplies the first four layers of the MAP protocol — the physical, data link, transport and network layers. The device was designed with four internal buses that surround random-access memory: a host interface bus, main processor bus, data bus and peripheral bus.

For those users with a token-bus interface modem, the ACP 6180 provides network and transport services on top of the ISO High Level Data Link Control link. The interface occupies one hexadecimal slot on the VAX Unibus.

For those users desiring an on-board token bus, the ACP 6480 provides transport and network services on top of the IEEE 802.2 logical link and 802.4 token-bus interface specifications, which have been incorporated into MAP as a standard transport mechanism. Media access is achieved by using a Motorola 68824 token-bus interface chip. A board-level modem connects the device to the network.

The company plans to introduce inter-

See **MAP** on page 24

INSIDE

Codex announces a new line of communications network processors, which the firm says are the most powerful available to date/**23**

NEW THIS WEEK

- AT&T introduces four Call Accounting Systems
- NCR Comten enhances its protocol converter

For more on these and other new products, see pp. 111-136.

INSTANT ANALYSIS

"Once MAP is fully implemented, we will be able to cut one to two years from our five-year product development cycle."

— Robert J. Eaton vice-president of General Motors, speaking at the recent Autofact '85 in Detroit

Net vendor gets software firm

Industrial Networking aims for OA market

By Paul Korzeniowski

SANTA CLARA, Calif. — Industrial Networking, Inc. fired a shot at its competitors in the emerging factory automation network market by acquiring Software Decisions, Inc., a Southfield, Mich., network software company.

Software Decisions, founded in 1983, develops and markets host-resident software for General Motors Corp.'s Manufacturing Automation Protocol (MAP), an architecture the car manufacturer is promoting as a factory automation standard. The company also wrote a package that determines if a vendor's product conforms to the seven-layer MAP network model.

Software Decisions "has emerged as a leader in the MAP software industry," noted Joseph P. Schoendorf, Industrial Networking president. By combining Software Decisions' "MAP software strengths with the networking expertise of our company, we have increased our ability to provide complete MAP solutions," he added.

Industrial Networking, founded in October 1984, is a joint venture formed by Ungermann-Bass, Inc. and General Electric Co. Industrial Networking supplies networks that conform to the IEEE 802.4 token-ring network specifications, hardware for the lower levels of MAP.

In September, GE announced that a MAP-compliant local-area network based on work by Industrial Networking, GEnet Factory LAN, would be available early next year.

See **NET** on page 26

M/A-Com offers data switch

By Paul Korzeniowski

SOLANA BEACH, Calif. — M/A-Com Telecommunication Division, Inc. has introduced the IDX750, a smaller version of its large data switch, the IDX3000.

The IDX750 can connect up to 768 full-duplex, asynchronous channels at speeds up to 19.2K bit/sec. The nonblocking data switch can queue requests whenever a line is busy and displays line status information. Privileged callers can put a current call on hold, take a second call and later return to the first.

The product's diagnostic capabilities include fault reporting, module self-tests and loopback tests. The switch enables users to connect to various devices on the network once an operator has loaded required configuration data.

The data switch works with multiplexers, a network exchange and a network controller.

Multiplexers concentrate onto one T1 trunk up to 24 asynchronous lines using twisted-pair wire at distances up to one mile. At greater distances, Bell North American DS-1 framing format supplies access to microwave, leased lines and satellite links. Dial-up modems can be used on the network, and the device enables modem ports to be connected to a host.

The network exchange performs data-switching functions and routes data through the data switch. On-line prompts and Help menus help configure the system. The device supports 32 trunks, each with 24 lines on one trunk.

The network controller, based on a Motorola, Inc. 68000 microprocessor, is resident on the network exchange and interfaces to the rest of the network through a set of virtual lines.

See **DATA** on page 26

WE CHALLENGE ALL COMERS TO A LASER BATTLE.

DIGITAL'S NEW LN03 IS FAST AND AFFORDABLE.

Until now, laser printers fell into the category of pure science fiction for most applications. Those that could handle even a modest work load cost more than the moon and stars. And those that were affordable just couldn't keep up with a busy office.

Now there's Digital's new LN03. The most productive laser printer you can buy for less than $7000. A lot less. In fact the LN03 costs little more than half that. Yet it leaves every laser printer in its price range in the dust.

For pure speed, nothing in the price range can beat the LN03. At 8 pages per minute – or 333 cps – it can handle the volume of a busy office with ease.

It also prints true compound documents, with business graphics and text on the same page, in a single pass. And it prints on virtually any cut sheet paper, including overhead transparencies. All of which makes it ideal for almost any multi-user environment.

IT WON'T WASTE YOUR TIME.

The LN03's real edge in speed and productivity comes from its paper handling capacity. With 250 page input and output trays, the LN03 can print thick documents – pre-collated – without reloading. Try that with any other laser printer in the class and someone will end up changing the paper 10 times or more, reverse collating every page by hand, and babysitting the entire process. Which is counter-productive to the whole idea of office automation.

BETTER QUALITY THAN LETTER QUALITY.

The LN03 also gives you advantages over daisywheel and dot matrix printers, too. Because one LN03 can do the job of the two conventional printers you're probably using now.

In fact it can do *more* than *both*. For a lot less money.

For starters, it forms characters precisely with 300 x 300 dot resolution. Characters that are not only far cleaner than your dot matrix printer, but even better than your letter quality printer. You may actually have trouble telling the difference between text that's been printed on the LN03 and text that's been professionally typeset. In fact the LN03 characters are so well formed, they're recognized by Optical Character Readers with no problem at all.

To give your documents a professional appearance, the LN03 lets you pick and choose from a virtually unlimited variety of typefaces, sizes and styles. And they've all been developed especially for the LN03 by Compugraphic Corporation, the world's recognized authority on computer-generated typefaces.

Two resident typefaces give you no fewer than 16 different sizes, styles and pitches, while optional ROM cartridges let you add just about any face or font you might consider. Including your own custom designed faces. You can even down-line load your own character set or custom designed graphics fonts to print your logo, letterhead or forms. If you like, the LN03 can print sideways, down the length of the paper as well as across, to accommodate spreadsheets, compiler listings, graph captions or other special effects.

In short, the LN03 gives you a remarkable combination of print quality and versatility. So every piece you print makes a great impression.

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FASTER AND MORE FLEXIBLE THAN DOT MATRIX.

The LN03 doesn't stop with better-than-letter-quality quality. It also gives you the advantages of dot matrix printing. And then some.

At 8 pages per minute, the LN03's speed approaches that of a line printer. The fact is, it's faster than both your dot matrix and daisywheel printer working together.

Crisp business graphics are a snap. And unlike either of your conventional printers, the LN03 can mix graphics and true letter quality on a single page. In a single pass.

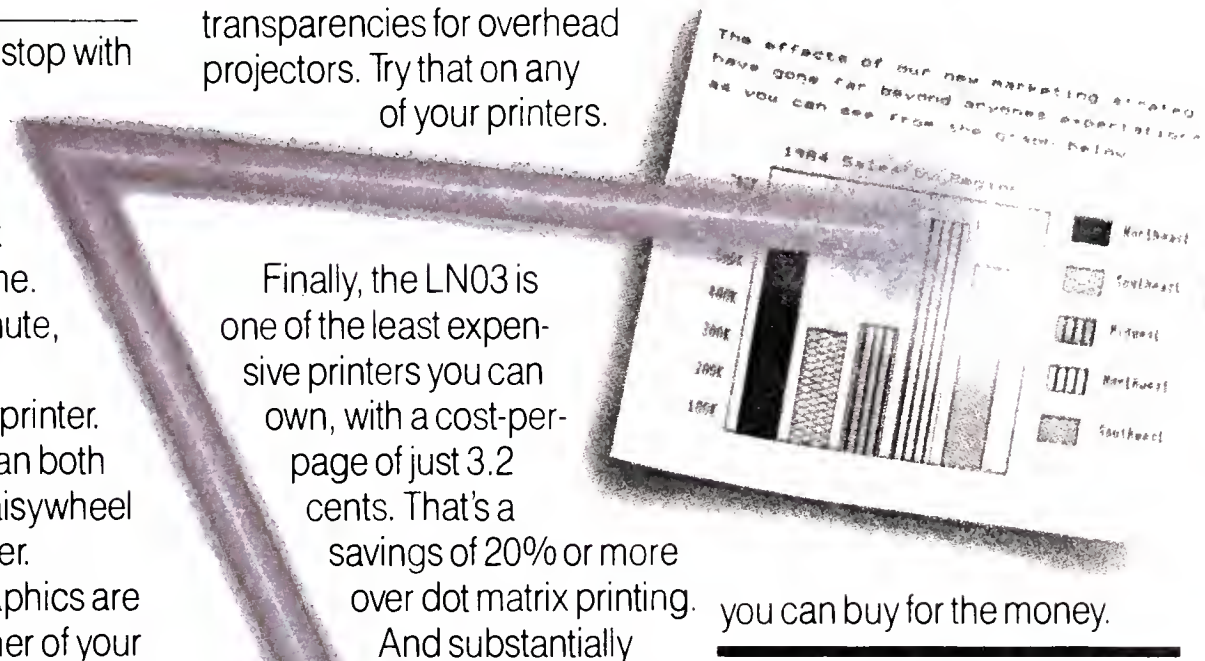
Noise is a barely audible 55 dB. Far quieter than any impact printer. No louder than your copier. So the LN03 won't distract and annoy workers even in an open office.

The LN03 will even make transparencies for overhead projectors. Try that on any of your printers.

Finally, the LN03 is one of the least expensive printers you can own, with a cost-per-page of just 3.2 cents. That's a savings of 20% or more over dot matrix printing.

And substantially more compared to your daisywheel printer.

So, an LN03 really makes a lot of sense. You get better economy. More flexibility. Additional capabilities. A professional look. Which makes the LN03 the most productive printer you can buy for the money.



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COMMUNICATIONS

Codex launches nodal processor

Motorola 68000-based tool handles 256 concurrent calls

MANSFIELD, Mass. — Codex Corp. unwrapped a communications nodal processor last week, the first in a new product series called the Codex 6700 Distributed Communications Processor family.

Touted as the most powerful nodal processor available to date, the Codex 6760 distributed processor can support up to 256 concurrent calls and continuous throughput of 40,000 characters per second. The switch can be used in point-to-point applications as well as in multinode topologies.

Codex, which is a subsidiary of Motorola, Inc. and a manufacturer of multiplexers as well as other data communications hardware, said nodal processor networks provide an attractive alternative to packet-switched solutions.

Based on Motorola 68000

To achieve the level of performance and range of features required and still make the product a cost-effective alternative to packet switching, the new switch family is based on the Motorola 68000 microprocessor and custom bit-slice processor technologies, Codex reported.

The 6760 is said to support a mix of protocols, including bisynchronous, asynchronous and High-Level Data Link Control or IBM Synchronous Data Link Control.

Protocol intervention is provided for IBM 2780/3780 RJE equipment in a nontransparent fashion. Acknowledge/Negative Acknowledge acceptance commands are issued to remote devices by the local serving node, limiting the need to go back to the host for acknowledgment and improving response time. The 6760 is also said to support an X.25 interface for use with public-switched networks.

Bandwidth allocation

Transmission efficiency is optimized with dynamic bandwidth allocation, Codex reported, where the bandwidth of the box is devoted only to active channels. Multiple protocols can be supported over the same statistically multiplexed link between nodes.

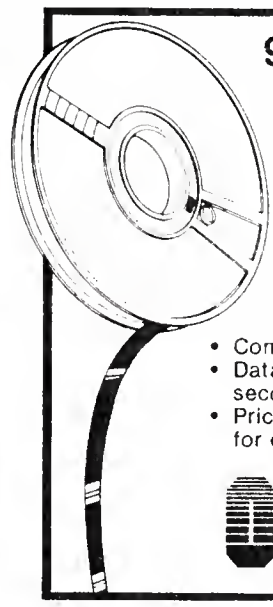
For further link efficiency, the 6760 uses Adaptive Data Compression, a technique that identifies and eliminates frequently occurring characters in a data stream.

Throughput is increased an average of 30%, the company claimed.

To optimize host and terminal resources, an algorithm is used to pick the minimum delay path for each session. The algorithm routes calls as needed to balance network loads and compensate for line congestion on high-speed links operating at up to 64K bit/sec.

A User Destination Routing feature enables users to select and contend for compatible network hosts.

A typical Codex 6760 Distributed Communications Processor carries a price tag of $45,000, including software, and is available for shipping within 90 days of the receipt of order.



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Xerox is about to move xerography light years ahead.

COMMUNICATIONS

GM and Boeing give protocols a hard sell at Autofact '85

DATA STREAM
Paul Korzeniowski
C.W. Senior Writer

One can't help but notice how General Motors Corp. and Boeing Computer Services Co. have begun to act like vendors. The companies were furiously pushing the Manufacturing Automation Protocol (MAP) and Technical and Office Protocol (TOP) at the recent Autofact '85 Conference and Exposition.

MAP, promulgated by GM, and Boeing-supported TOP are seven-layer network architectures based on International Standards Organization (ISO) specifications.

The architectures were

> *Connectivity is a goal most MIS managers have desired since they received their first paychecks.*

the center of attention at the Detroit show. The reason? They promise to make it possible to link different kinds of computers. Connectivity is a goal most MIS managers have desired since they received their first paychecks. The MAP-TOP booth overflowed with expectant engineers and MIS managers.

Vendors also lined up to support MAP and TOP but perhaps a little less willingly than the user visitors. GM and Boeing, two of the largest computer users, have made it clear that they intend to require all information processing equipment they buy to conform to MAP or TOP. In essence, the companies have put a multimillion-dollar gun to the heads of the vendors.

For too many years, users have been saddled with incompatible products. Systems that provided solutions for one department were inaccessible from other departments. As a result, users like GM and Boeing have been left with automation islands and few truly integrated systems.

In theory, MAP and TOP will integrate all of GM's and Boeing's computer systems. In fact, MAP and TOP may suffer a protracted adolescence like other overly hyped ideas such as artificial intelligence and integrated voice and data capabilities. Presently, MAP and TOP are more talk than substance. GM doesn't have one operational MAP prototype, nor does Boeing have a demonstrable TOP net.

A number of companies took part in a MAP-TOP demonstration at Autofact. One product was a job scheduler from Hewlett-Packard Co. The offering played a small role in the network, a typical situation for products of the 21 vendors taking part in the demonstration. Pieces of MAP are available, but no one vendor can supply a complete network.

Nor is that the point of the architectures. MAP and TOP are models, not products, and when vendors incorporate the common interfaces and specifications, they should, theoretically, be able to communicate.

Historically, however, standards have given vendors some design latitude that often translates into in-

MAP boards announced

From page 19

faces for other boards, according to Paul Nelson, an Advanced Computer Communications product manager. The second set of boards will be a Q bus interface that will be released in the second quarter of 1986.

Prices for the 6180 range from $5,000 to $7,000 and for the 6480 from $4,000 to $7,000.

compatibility. A spokesman from Concord Data Systems, Inc. noted that, in one case, two MAP-compliant terminal servers were unable to communicate until both vendors tinkered with the products.

As part of an Autofact demonstration, a network was designed to produce a small board with three pegs for a game called the *Towers of Hanoi*. During a press conference, cameras showed the network in action. Rather than a board with three pegs, one with two pegs was produced. A rather embarrassed GM employee attempted to smile at the camera as the production ground to a halt.

Progress still needed

The demonstration illustrated just how much progress is required before MAP and TOP can begin to supply the benefits they boast. GM will establish pilot programs in a few plants next spring, and Boeing is scheduled to implement a TOP pilot at the same time.

GM estimated that it will take until 1988 for MAP to be implemented, and Boeing painted a similiar picture for TOP implementation.

Much of the work between now and 1988 will be to further redefine and specify sections of the models. Only the first two model layers have been fully specified and accepted as complete by the ISO, although many others are nearing acceptance.

Most of the work for layers three through five has been done. Some work has been finished for layer seven, the application layer. Little progress has been made for the sixth, the presentation layer — a key layer because it provides translation capabilities between different types of machines.

By leveraging their purchasing power, GM and Boeing may force vendors to meet their needs. Wave a $10 million contract in front of a vendor, and it will salivate like Pavlov's dog.

But smaller companies should carefully weigh their investment in MAP or TOP, which may prove to be more expensive than alternatives. Without leverage such as that provided by GM, smaller companies may be unable to force vendors to live up to their claims.

They could be left with a network that looks great on paper but supplies few tangible benefits.

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TeamXerox

And while other desktop printers serve primarily one workstation at a time, the Xerox 4045 Laser CP is designed to accommodate four.

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Octel touts mail system

From page 19

telephone company option that gives each user a telephone number, minimizing central switchboard personnel.

With direct inward dialing, customers lease telephone numbers from their telephone company in blocks of 100.

The first two or three digits of that number are common to all company numbers, and the remaining digits denote extensions.

As with standard service trunks, fewer direct-dial trunks are needed than actual number of extensions supported. The number of trunks needed is calculated using ratios that take into account the fact that not all users will be receiving calls at the same time. Direct inward dial service, however, does require use of more trunks than usual because they cannot be used for outgoing calls.

Automated call-routing systems like Aspen and those provided by other companies can be used with standard trunk lines, saving that expense. The systems also eliminate private branch exchange hardware required to support direct inward dial trunks.

According to Cohn, Aspen can be interfaced with any PBX in the U.S. and integrated with Centrex services and numerous PBXs, including systems from Rolm Corp., Northern Telecom, Inc., Mitel Corp. and Hitachi Ltd.

Integrated voice mail systems support automatic call forwarding — interfaced systems do not — and alert the users when they have mail by lighting a messaging waiting lamp or giving a broken dial tone.

Cohn went as far as to say that Octel integrates with more types of PBXs than any other voice message system.

The Enhanced Call Processing software option for Aspen and Aspen Branch — which range in capacity from four to 24 ports and provide six to 63 hours of message storage — costs $5,000.

Hiring staff: an artful skill

From page 19

ity. Career-long accomplishments should be given appropriate value; experience should be valued even if acquired prior to the last position.

It is important not to overhire for a position, both monetarily and technically, and ideal to get the right level of person who is self-motivated and creative. During the interview process, it is important that the data communications manager cover three areas — negative job aspects, company culture and career path.

If there are negative aspects of a job, such as long hours, travel or lack of clerical support, they should be mentioned right away. Hiring people and having them leave a few weeks later because of environmental factors is not cost-effective to the firm. It requires the long, expensive hiring process to begin again.

Some managers spend 70% of the interviewing time discussing the realities of the job and 30% of the interviewing time discussing the idealized issues of the job. A candidate briefed in this manner is well prepared to face the challenges.

The company culture should be discussed openly. If the right technical person is found, but there is a major cultural discrepancy, the data communications manager should put himself in the candidate's shoes. Failing to do so may again imply a mismatch and a repetition of the restaffing effort with the high associated costs.

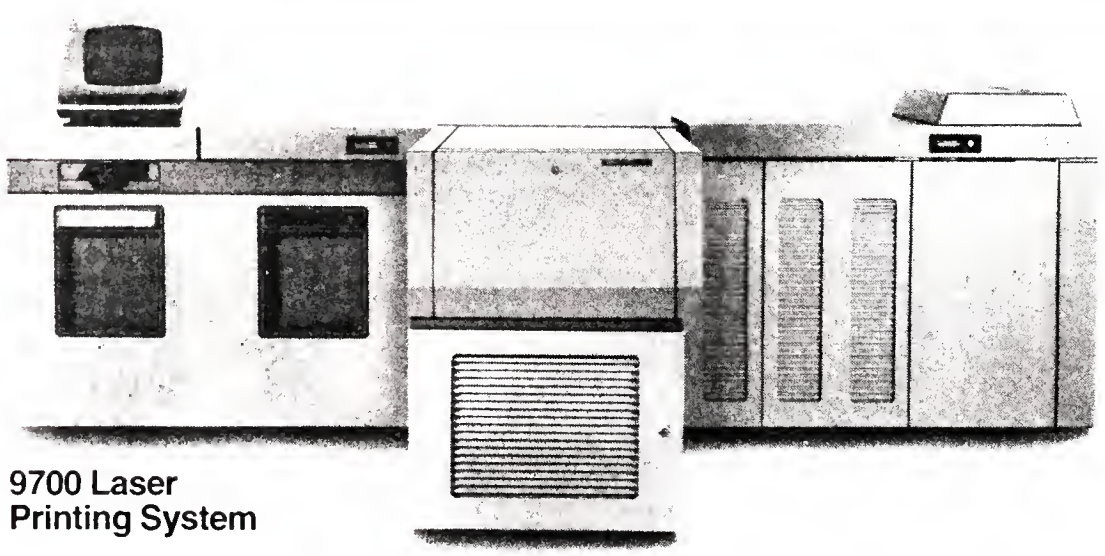
For example, a longtime military person may find it a challenge to adjust to a matrix management environment. By the same token, onetime common-carrier employees may find it hard to switch to a user environment. The issue is accentuated when the job switch is intercompany rather than intracompany. Not all individuals will find job adjustment hard, but it is important to be aware of the risk.

Third, the realities of career path opportunities should be addressed. Here it is better to err on the side of caution rather than be overly optimistic. It is all too easy to say that great opportunities exist.

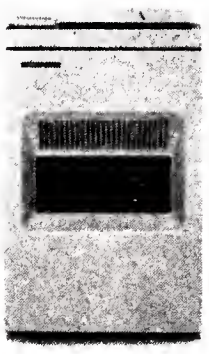
Instead, the data communications manager should give some typical figures representing actual promotional opportunities.

In this three-part series some empirical issues, which may prove useful in selecting and retaining the best possible data communications staff, have been raised [CW, Nov.4; Nov. 11]. Employees' loyalty and satisfaction will go a long way to improve the overall quality of the network services rendered by the communications department.

XEROX



9700 Laser Printing System



2700 Laser Printing System

As you can see Xerox has developed an entire family of laser printers.

Each one designed to fit a variety of needs.

But they all have many things in common.

For instance, Xerox has long set the industry standard for quality printing. The laser printers you see here uphold that standard nicely.

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You can handle everything from a few quick documents at a workstation, to thousands of catalogues.

But the flexibility of Xerox laser printers doesn't stop with speed or output. They're versatile enough to give you a choice of hundreds of type styles.

Four of our models can produce graphics with stunning clarity.

And all of them, the 4045, 2700, 3700, 8700, and 9700, will even print out almost any kind of form, not to mention text, tax forms, invoices, billing statements, and catalogues.

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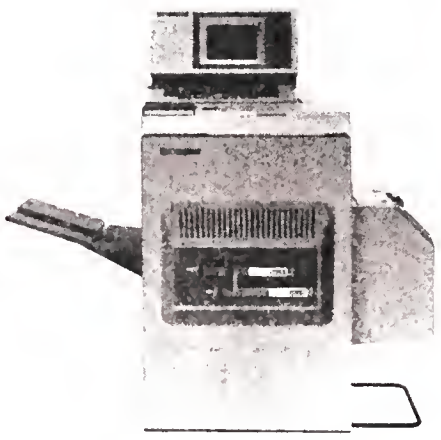
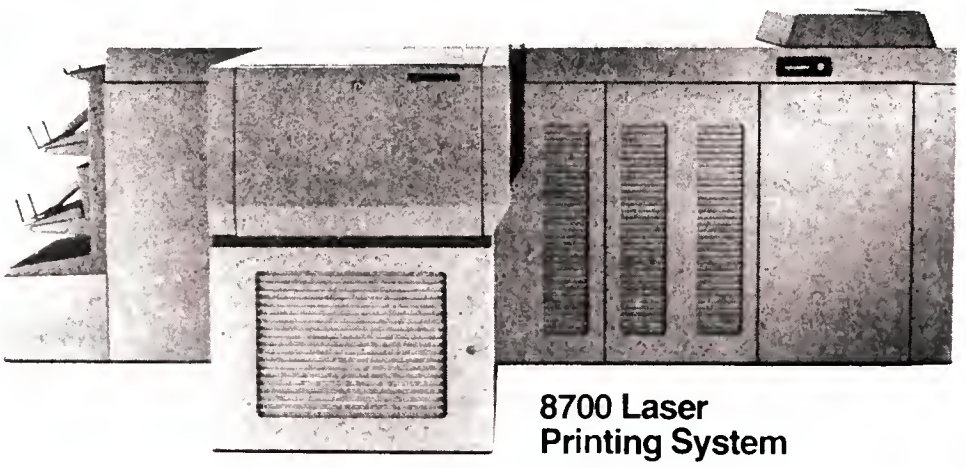


3700 Laser Printing System



8700 Laser Printing System

Data switch introduced

From page 19

The controller supplies up to 1M byte of random-access memory and a 10M-byte hard disk.

The product supports 768 lines and can be expanded to support 3,072. The data switch is compatible with Digital Equipment Corp.'s DMZ32 that connects 24 lines to a VAX superminicomputer.

The IDX750 is priced at $110 per port.

Net vendor buys firm

From page 19

The 10M bit/sec. network consists of a bus interface unit, head end remodulator, network management console and network software.

Software Decisions was said to supply some Industrial Networking network competitors with the software they needed to link their nets into the operating environments of CPU vendors.

Paul F. DePond, Software Decisions president and chief executive officer, will now report directly to Schoendorf. The two companies will continue to operate in their locations. Industrial Networking Vice-President Michael S. Gardner will assume Software Decisions' sales and marketing operations.

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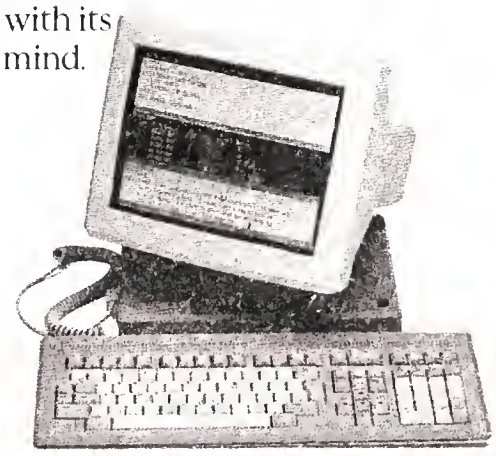

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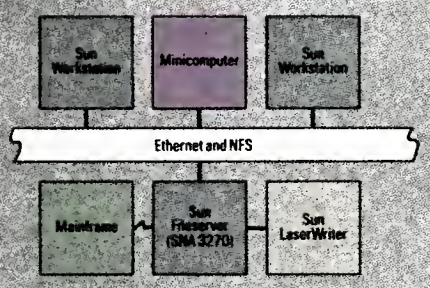

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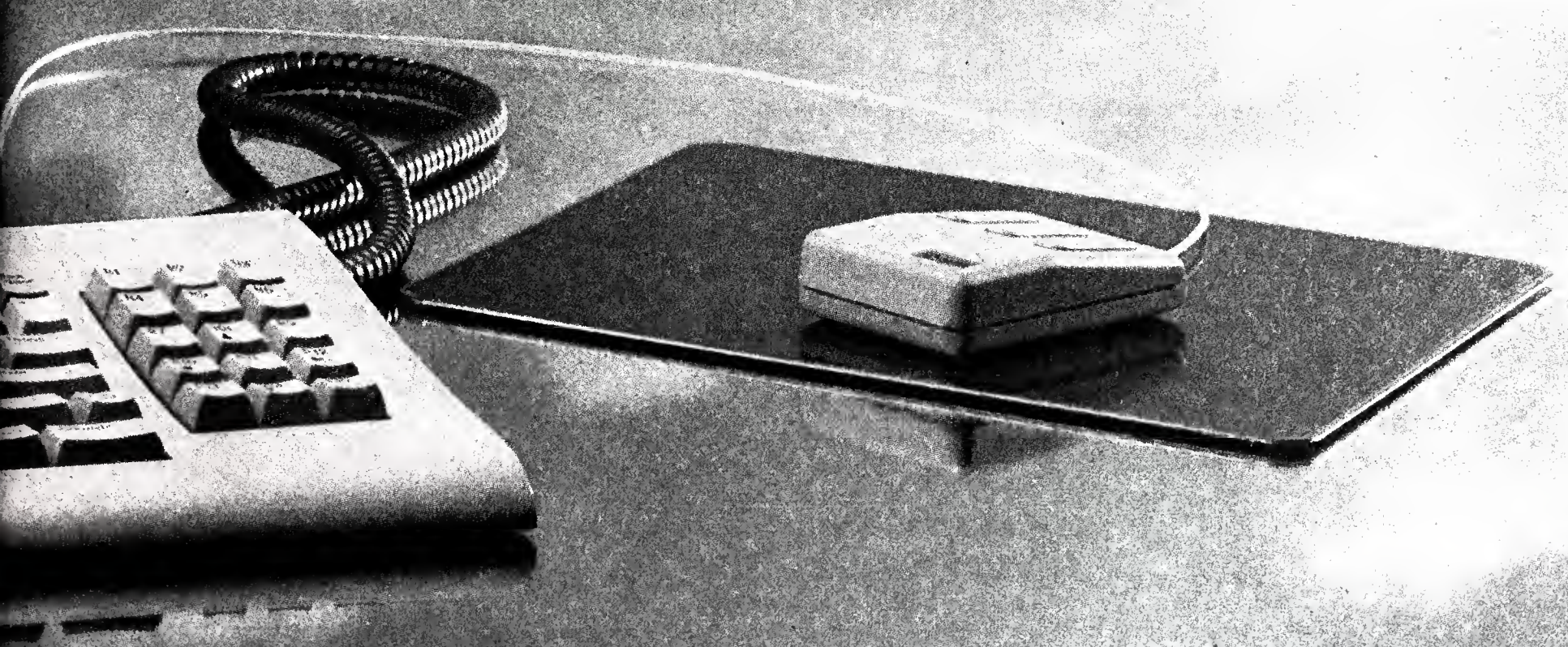

†with optional floating point accelerator board. Sun Microsystems, Sun-3, the Sun logo and SunLink are trademarks of, and Sun Workstation is a registered trademark of Sun Microsystems, Inc. *UNIX is a trademark of AT&T.

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CW Senior Writer

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Mother Hubberds Tale

Fourth-generation language products are taking a step backward to go forward.

Claims have caught up to the vendors, many of which a year ago were marketing the higher productivity languages as a replacement for Cobol. Several vendors of the major languages were recently asked to supply the names of users that were basing major operational systems on a fourth-generation language. None of those users contacted by *Computerworld* had completely done away with Cobol. As long as the programs work, Cobol may never go away.

Fourth-generation language aficionados point to Morgan Stanley and Co. of New York as the firm that swore off Cobol some four years ago. As trade mythology has it, Morgan Stanley did away with Cobol and now does all of its programming in Software AG's Natural. It is true that Morgan Stanley has shifted its primary focus from Cobol and now does most of its programming in Natural, but the company has not eliminated all its Cobol programs and has no intention of doing so.

Morgan Stanley maintains some 20 compute-intensive programs in Cobol, PL/I and assembler. "If we took those 20 programs and wrote them in Natural, we might double our CPU consumption," said Scott Abbey, vice-president of data administration at the firm.

The new role of Cobol in those mainframe shops that have made a major

See **LANGUAGES** on page 39

Spreadsheet test users prefer SQL Calc despite glitches

By John Desmond

Two beta test site users of Oracle Corp.'s SQL Calc, which is integrated with a microcomputer version of the Oracle relational data base management system, said they would use the new spreadsheet as a replacement for Lotus Development Corp.'s 1-2-3, despite experiencing some glitches.

Announced last week, SQL Calc offers screens and commands similar to 1-2-3's, in addition to IBM SQL-compatible commands. IBM's SQL, known for its data manipulation capabilities, is the IBM standard query language used in SQL/DS and DB2 relational DBMS products. SQL Calc operates on an IBM Personal Computer XT or AT with at least 512K bytes of memory and 2M bytes of hard disk storage, at a price of $995 including PC Oracle. Users with PC Oracle pay $395 for the SQL Calc spreadsheet. Oracle plans to offer SQL Calc on a variety of systems, including IBM mainframes and minicomputers from Digital Equipment Corp. and Data General Corp. as well as most AT&T Unix systems in the second quarter of 1986.

Users at Electronic Data Systems Corp.'s (EDS) eastern regional data center located in Camp Hill, Pa., and at Citibank in New York described their experiences with SQL Calc.

The Citibank user, who declined to be named, said he is using SQL Calc on a Personal Computer XT with 640K bytes of memory and a 10M-byte hard disk. The XT is connected to a DEC VAX through another vendor's communications software. The major advantage of SQL Calc, the user said, "is the ability to use Oracle [DBMS] tables within the spreadsheet."

See **SPREADSHEET** on page 34

SOFTSCOPE

Tokyo firm to market Ramis II

Three's company. **Martin Marietta Data Systems** formed a three-company consortium to establish a Tokyo-based software company to be called **Intelligent Systems Co.** The firm will market and support Martin Marietta's Ramis II fourth-generation language in Japan. Other companies in the consortium are **Mitsui & Co.**, one of Japan's largest firms, and **Florida Progress Corp.**, the parent company of **Florida Power.** As part of the joint effort, a version of Ramis II supporting the Kanji character set will be developed.

See **SOFTSCOPE** on page 33

Software out for Cyber processors

By John Gallant

MINNEAPOLIS — Control Data Corp. last week moved to bolster the availability of applications software for its Cyber 180 processor line.

The company introduced a utility that automatically converts programs written in Digital Equipment Corp.'s VAX-VMS Fortran to CDC's NOS/VE Fortran for use under the NOS/VE operating system. CDC also unveiled a new Independent Software Vendor (ISV) program to encourage vendors to migrate applications for the Cyber 180/NOS/VE and the first two offerings in that program.

According to a company spokesman, the Fortran Conversion Aid (FCON) allows programmers to convert automatically the majority of VAX-dependent Fortran source code to its Cyber 180 equivalent.

See **SOFTWARE** on page 39

INSIDE

Twelve aerospace firms formed a consortium to develop reusable software and prototyping tools/**41**

Coordinating growing end-user computing has become a key MIS task, according to a DPMA conference speaker/**42**

NEW THIS WEEK

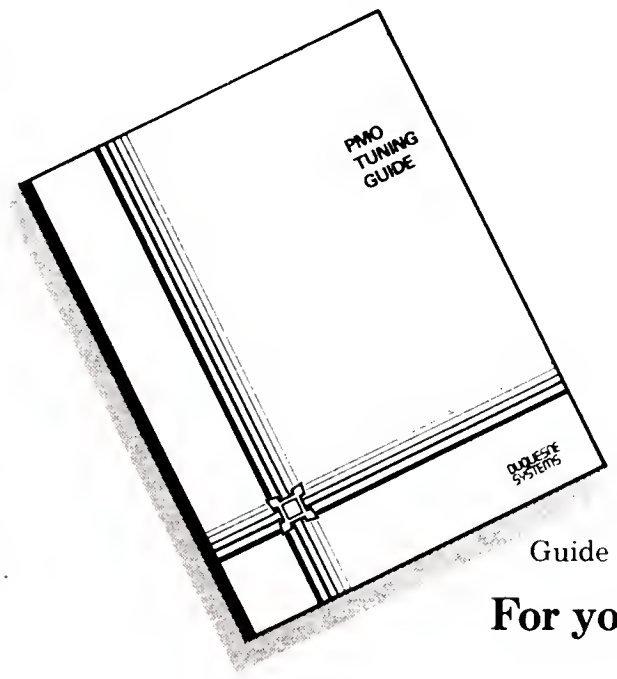
- McDonnell Douglas enhances Reality
- ITT adds Advanceline to Dialcom network

For more on these and other new products, see pp. 111-136.

INSTANT ANALYSIS

"The biggest obstacle facing fourth-generation languages is the stubborness of DP managers who insist on doing everything in Cobol."

— Philip Dorn
Dorn Computer Consultants



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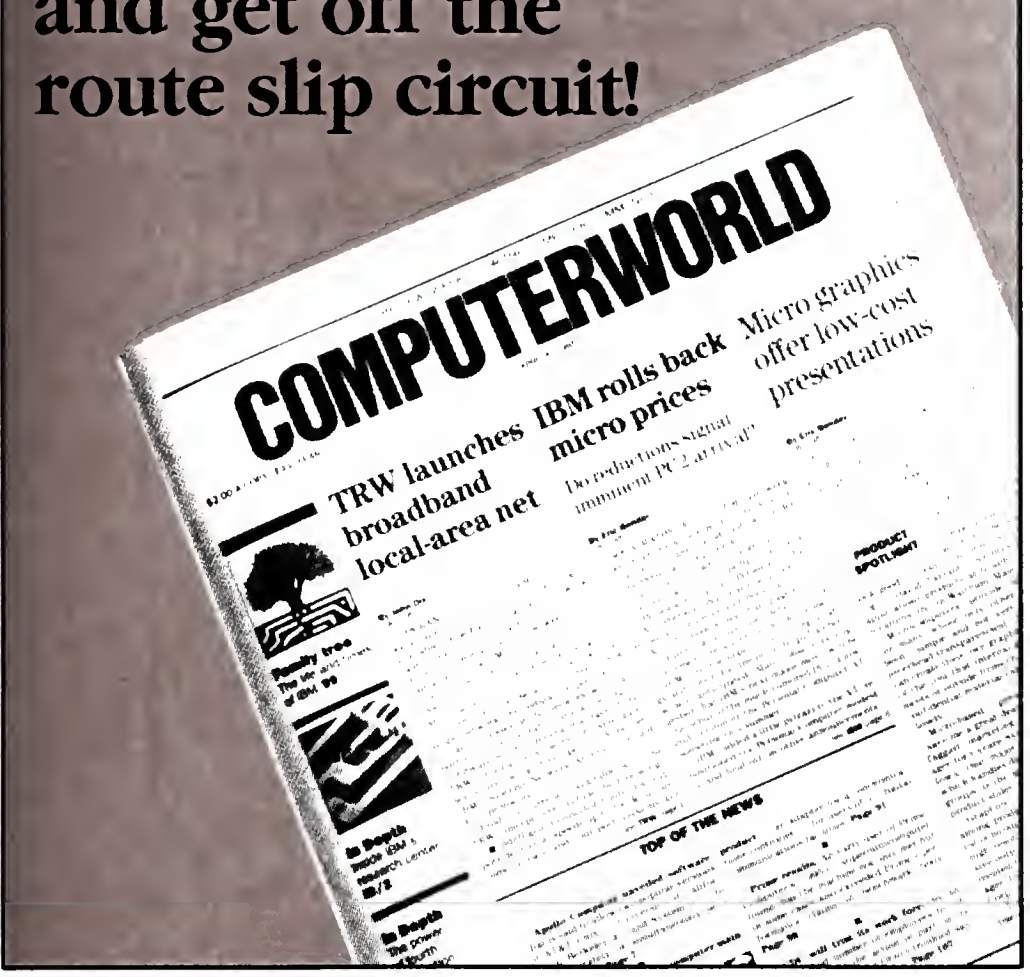
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PRODUCT SPOTLIGHT

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   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems

4. **PLEASE SPECIFY THE MAIN COMPUTER AT YOUR SITE:**
   Manufacturer: _____
   Model: _____

SOFTWARE & SERVICES

Softscope notes

From page 31

Teaming up. **Soft-Switch, Inc.** has joined forces with two of the biggest names in the computer industry — **IBM** and **Electronic Data Systems** (EDS). The company's Soft-Switch document distribution software will now be available through IBM's Information Network. The software supports the exchange of revisable and final-form documents among a variety of office system environments.

EDS, a subsidiary of **General Motors**, signed a licensing and reseller agreement with Soft-Switch. Through the deal, EDS acquired a corporate license to use the company's software and rights to market those products to its own customers. EDS also obtained a corporate license to use Soft-Switch products in its 31 information processing centers nationwide. Each center handles data processing for GM, EDS and EDS' customers. EDS also became a venture-capital investor in Soft-Switch, acquiring an equity interest in the firm.

■

You're in the navy now. **Computer Corporation of America** (CCA), whose Model 204 DBMS was chosen by **IBM** for use in a U.S. Department of Defense contract, was recently awarded a $1.5 million multilicense contract with the **U.S. Navy**. The service's Military Personnel Command will use Model 204 to manage the Navy's officer and enlisted personnel distribution. The DBMS will be incorporated into the Navy Military Personnel Distribution System. CCA's UK sister company, **CCA Limited**, earlier won a $575,000 contract with the **Royal Navy**, which will use Model 204 for its Naval Manpower Information System. Sources within CCA said the Royal Navy contract caused something of a stir in the UK because it represented a reversal of the service's long-standing **ICL** mainframe-only policy in favor of **IBM** mainframes.

■

Reaching out. **AT&T** will nearly double the number of its nationwide customer programming services centers, which offer customized software design and other services to users of AT&T micros and 3B computers. The five new centers, which will bring the number of such facilities to 11, will open this month in Boston, Dallas, Los Angeles, Seattle and Washington, D.C. The centers offer technical consulting, project management, customized programming and on-site training services. Personnel manning the facilities include Microsoft MS-DOS and AT&T Unix programmers, systems analysts, applications consultants, documentation specialists and project managers.

■

Baiting the hook. With IBM's announcement that it is dropping support of System/34 software, **Wang** is really pushing its RPG-II Conversion Aid, a software package that converts applications written in IBM's RPG-II to run on Wang's VS processors. Wang is offering up to eight hours of conversion planning consultation to companies that purchase the $750 package. Users will be able to choose the nature of that support. Clients will also receive up to 40 hours of free technical assistance during the conversion period.

■

Users unite. Licensees of Nomad2, **D&B Computing Services, Inc.**'s fourth-generation language, have formed a users group. Formed as a nonprofit corporation under Delaware law, the **Oasis Software Corp, Inc.** is designed to promote the exchange of information among users and to facilitate communications between users and D&B Computing Services.

■

Data center link. **Duquesne Systems, Inc.** and **VM Software, Inc.** have developed an interface that allows Duquesne's Shared Tape Allocation Manager for IBM's MVS operating system to interact with VM Software's VMtape package. The interface, to be available in January, will allow tape drives to be physically shared between VM and MVS without operator intervention. Shared Tape Allocation Manager allows MVS users to automate the allocation of shared tape devices; VMtape is a tape drive and volume management system.

■

Ada ahoy. The **Software System and Technology Division** of **Control Data Corp.** has begun work on a $13 million contract to develop the Ada Language System/Navy for the U.S. Navy. Ada Language System/Navy will be an expandable set of programmer support tools for large-scale Ada software systems for Navy standard computers. The contract will be in effect for four years.

■

Short stuff. **Data General** said **Relational Database Systems, Inc.**'s Informix family of relational DBMS tools will be available for DG's Eclipse MV superminis and its DS line of engineering workstations. DG will market and support the products.

Plexus Computers, Inc. will market and support **R Systems, Inc.**'s R Office, R Desk and R Word office automation software, and **Access Technology, Inc.**'s 20/20 spreadsheet package for Plexus' Unix-based multiuser computers.

Global Software, Inc. and **Applied Data Research** signed a complementary development and marketing agreement that provides for the joint development of ADR Datacom/DB compatible versions of Global's business applications.

Oracle Corp. said **IBM** will be selling and supporting the Oracle relational DBMS on the IBM System/88 line of fault-tolerant computers. Oracle's compatibility with IBM's SQL/DS and DB2 allows applications written for those systems to run on the System/88 under Oracle.

Applix, Inc. is porting its Alis office software to run on **Apollo Computer, Inc.**'s family of Domain workstations and server processors. **Stratus Computer, Inc.** will comarket **Retrieval Systems Associates'** Gensoft electronic publishing software with its minicomputers.

■

The case for CASE. **Softool Corp.** and **Sun Microsystems, Inc.** inked an agreement whereby Softool will provide three of its computer-aided software engineering (CASE) packages for the Sun line of workstations. The packages are Change and Configuration Control Environment, Fortran Programming Environment and C Programming Environment.

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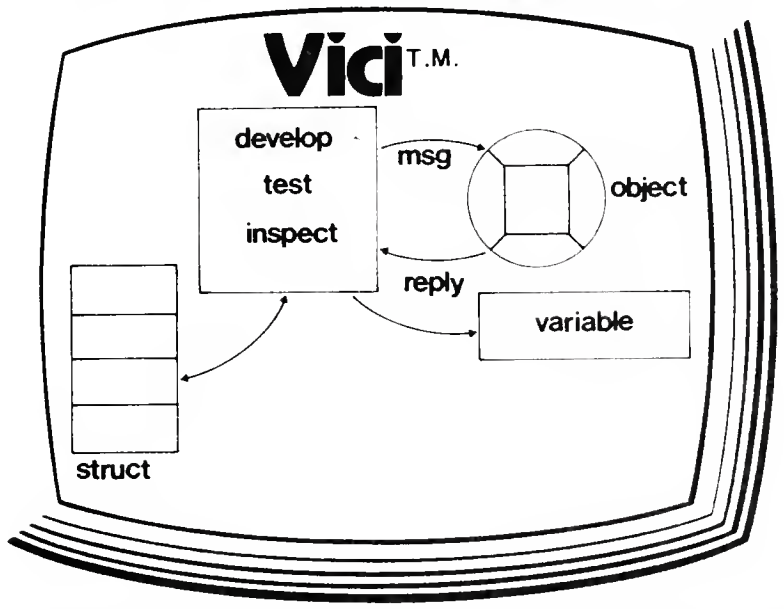

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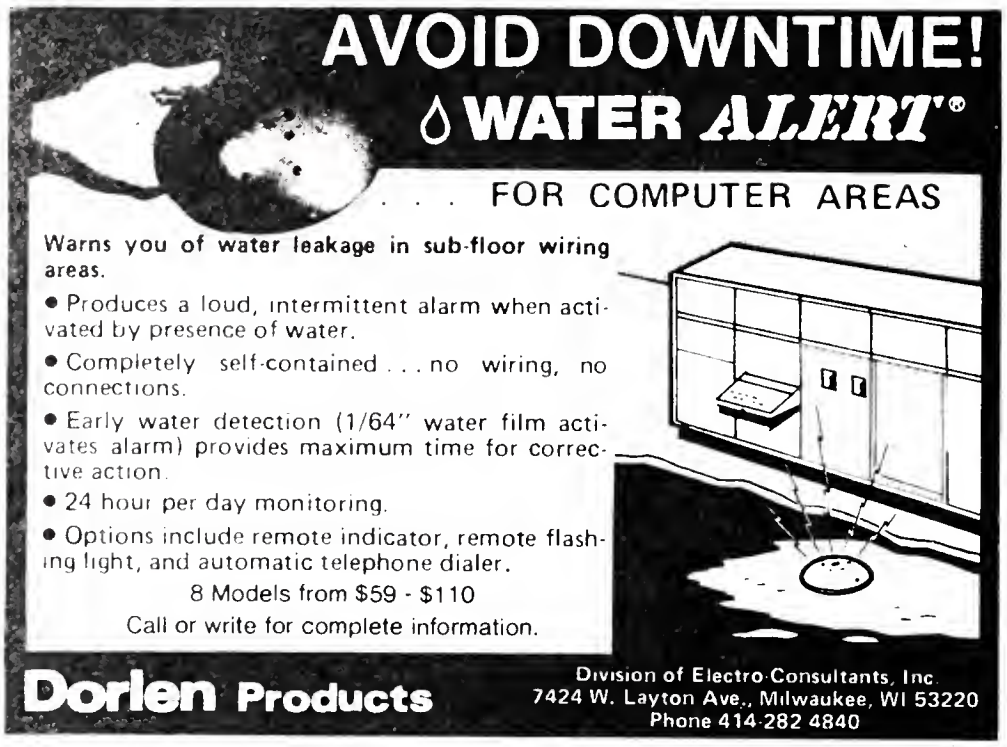
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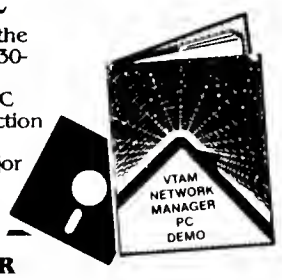

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SOFTWARE & SERVICES

Spreadsheet users prefer SQL Calc

From page 31

The Citibank user told *Computerworld* he was spending a great deal of time typing data into the 1-2-3 spreadsheet. To enter data manually into 1-2-3 tables took six man-days once per month for one Citibank application, he said. The same task with the test version of SQL Calc used by the bank now takes 30 minutes, the user claimed.

The test version was not without its problems, however. SQL Calc sometimes provided incorrect values because it occasionally failed to assign a zero, or null value, when appropriate, the Citibank user said. He added that the bug had been almost completely corrected by Oracle.

The user found that, except for SQL statements and certain Oracle capabilities, the interfaces of SQL Calc and 1-2-3 are virtually the same.

The Citibank user said he will likely replace 1-2-3 with SQL Calc for his own use. His job is to make recommendations to each Citibank operating department on whether to use SQL Calc.

While a final determination will not be made until he receives another update of the software, the user said he is likely to recommend use of SQL Calc for those departments that need to save time on manual data entry. "I feel it will pay back quickly," the user said.

Compared with 1-2-3, according to EDS' Ann Keiper-Smith, SQL Calc is "easier to read and easier to work with." Keiper-Smith, whose work is classified, uses the spreadsheet to manipulate statistics for applications used by the U.S. Marines and Navy.

> *"Except for SQL statements and certain Oracle capabilities, the interfaces of SQL Calc and 1-2-3 were found to be virtually the same."*

She installed SQL Calc in August on an IBM Personal Computer XT with 640K bytes of memory, used on a stand-alone basis. As a 1-2-3 user, Keiper-Smith was interested in cutting down on time spent manually entering data for spreadsheet calculations and data base updates. With SQL Calc, "I'm really pleased with how easily I can get data out of my data base," she said.

In a typical operation using 1-2-3, Keiper-Smith had to print out a list of files she wanted to manipulate, then manually type the required data into the spreadsheet. Once a calculation was complete, she would print out the results and type in the data that was required to update her data base.

"It was a waste of time," she said of the data entry. SQL Calc allows her to pull data into the spreadsheet directly from the Oracle DBMS with a simple command. An SQL Calc function also allows her to update the DBMS once the calculation is executed.

A capability not offered in SQL Calc that Keiper-Smith would like to see is a command set feature. That would allow a user to group a set of SQL commands together and save them for repeated use.

Files not maintained by 1-2-3 can be transferred to 1-2-3 spreadsheets, but they must first be converted into the Document Interchange Format. "It's a real pain," Keiper-Smith said of the conversion process.

In an SQL Calc bug detected by Keiper-Smith, arithmetic calculations were off by 1% for fractional decimal digits. The vendor has corrected the problem, she said. Also, she found that SQL statements longer than 256 characters would disrupt her processing by corrupting her data base and spreadsheet. In such cases, both had to be reformatted.

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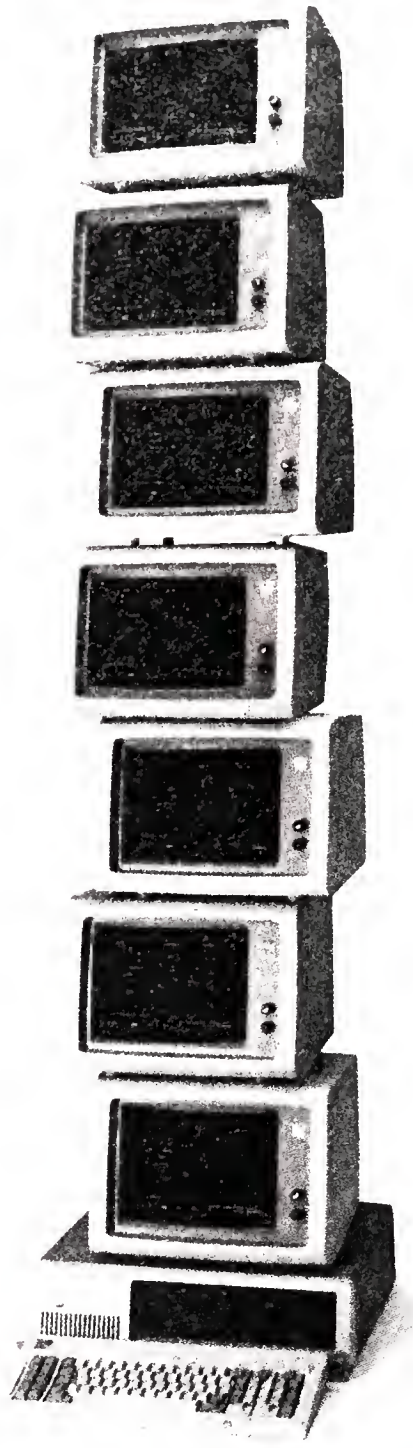

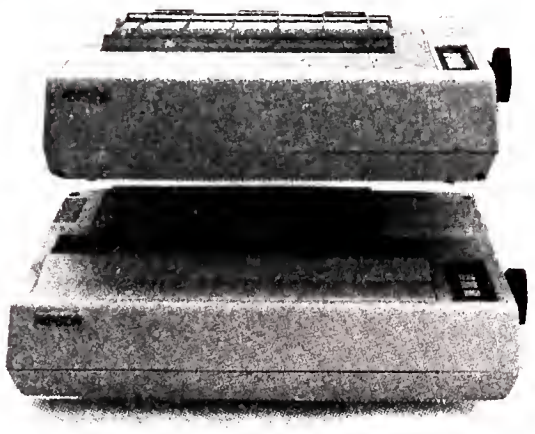

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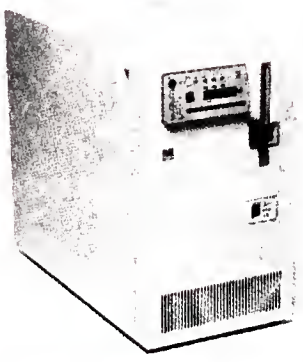

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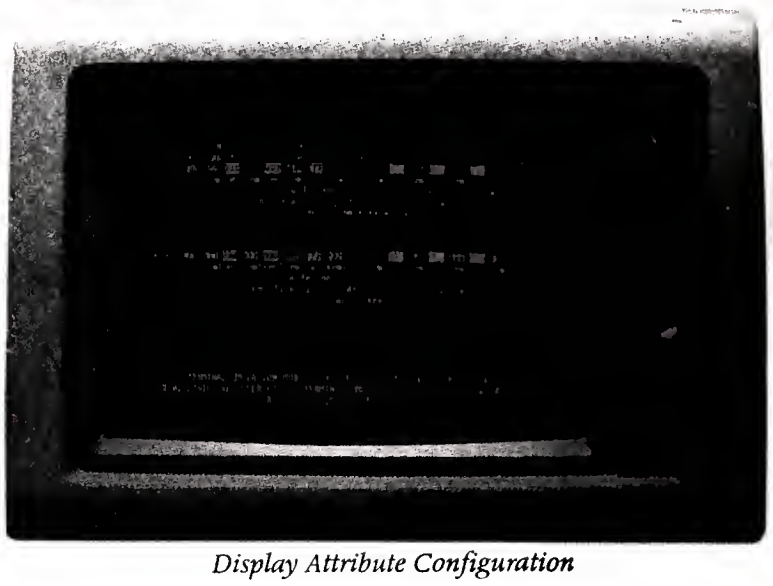

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AST-5251/11—The Direct PC To 34/36/38 Connection. Standard twinax cable, just like IBM's, makes this connection the most convenient for you. Our Hot-Key support provides a toggle between PC DOS and two host sessions. And our new enhanced version, AST-5251/11 Plus, even allows up to seven System 34/36/38 sessions—all concurrently.

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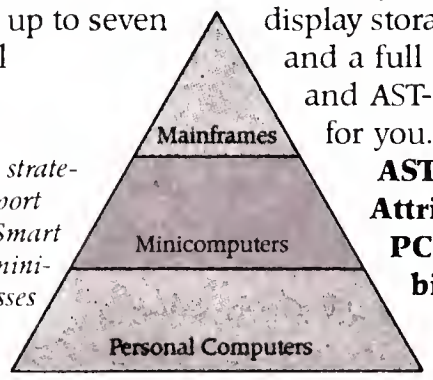

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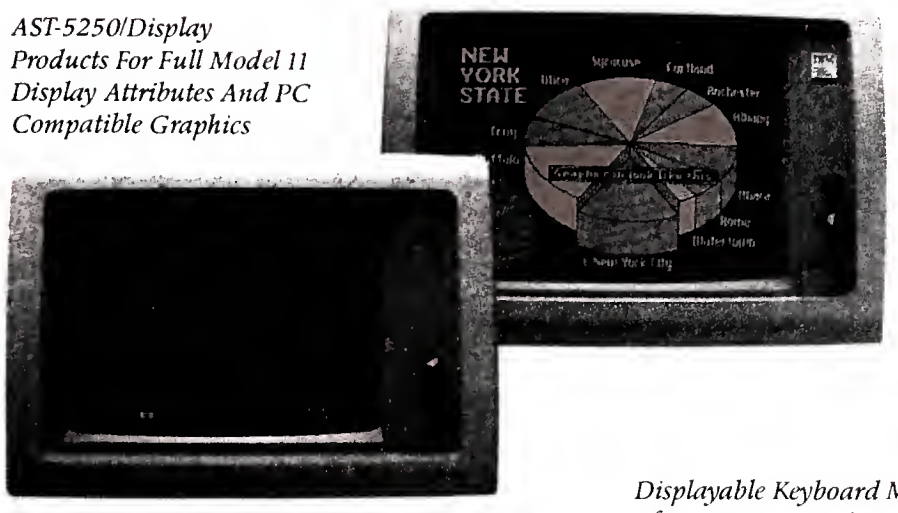
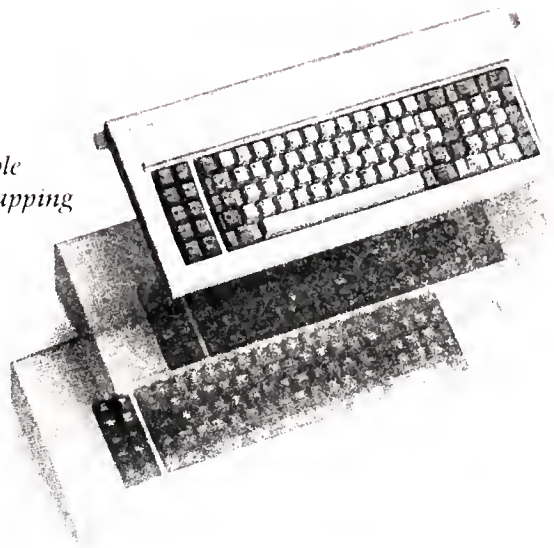
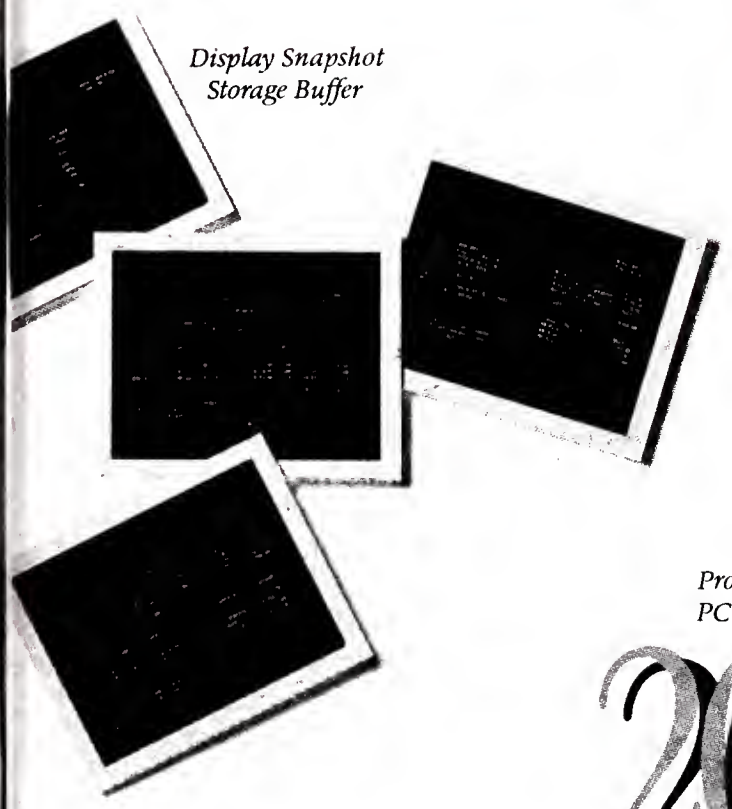


User Definable Keyboard Mapping



Displayable Keyboard Map of Program Control Keys

Display Snapshot Storage Buffer



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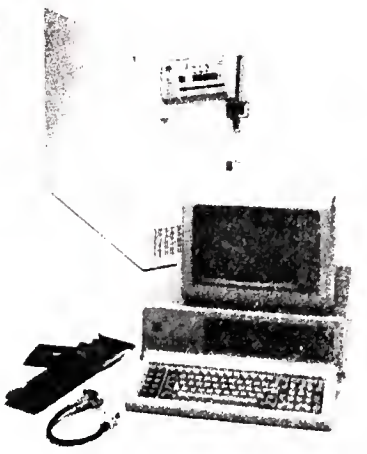

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First, a Brief Introduction to the IBM PC Modems:

The IBM 5841 is a stand-alone modem capable of operating at 0-300, 600 and 1,200 bps in asynchronous mode, and 600 and 1,200 bps synchronous.

Our other modem is the IBM Personal Computer Modem—an internal, half-card modem that operates at 0-300, 600 and 1,200 bps asynchronous.

The Non-Identical Twins

In some respects, these two modems are very similar. For example, they both have Automatic Adaptive Equalization—which means they will continuously fine-tune themselves to compensate for changes and noises on the telephone line. The result is, you can receive data over a wider range of phone line conditions. This is one of those features more often found on faster, more expensive modems.

In addition to automatic answering, both modems offer Adaptive Dialing—which means that if you don't specify either tone or pulse dialing, the modems try tone dialing for one digit, and if that doesn't work, they automatically switch to pulse dialing.

Both modems will automatically redial a number as many times as you tell them to. Or if you prefer, they can switch to an alternate number on a busy signal or a no answer. Once a connection is made, the modems automatically detect and adjust to the incoming transmission speed. They can also initiate an automatic log-on sequence including control characters, ID number and password.

And both modems have extensive "Help" menus, a complete complement of built-in diagnostics, a programmable speaker, and two phone jacks on the back so both your phone and the modem can be connected to the same line at the same time. You can even switch between voice and data without interrupting the phone call.

A Modem with a Memory of Its Own

The IBM 5841 stand-alone modem has some additional features you don't usually find on 1,200 bps modems. For example, the modem is switchable between asynchronous and synchronous modes and has a 20-entry Dialing Directory. Kept in non-volatile storage, the directory enables the modem to dial up and log on to systems automatically. This feature is most convenient when the 5841 is used with a fixed-function ASCII terminal such as the IBM 3161 or 3163.

The front panel of the 5841 has a complete array of eight LED Status Indicators to give you a quick visual check on what's happening.

A Half-Card Is Better Than a Whole

Why? Because the IBM Personal Computer Modem can use a short slot in the IBM PC XT and the *Portable* PC. It also fits nicely into a full slot in the IBM PC and the PC AT.

Another nice touch is that a PC diagnostic diskette comes with each of these half-card modems.

Standards & Compatibility

You'll be pleased to know that both modems meet the Bell 103/212A and V. 22 CCITT standards. Both can use the industry standard "AT" command set, as well as the IBM command set. And both modems have been tested for compatibility with leading PC communications software such as the IBM PC Communications Manager, Crosstalk™ XVI, Smartcom II® and Transporter.™

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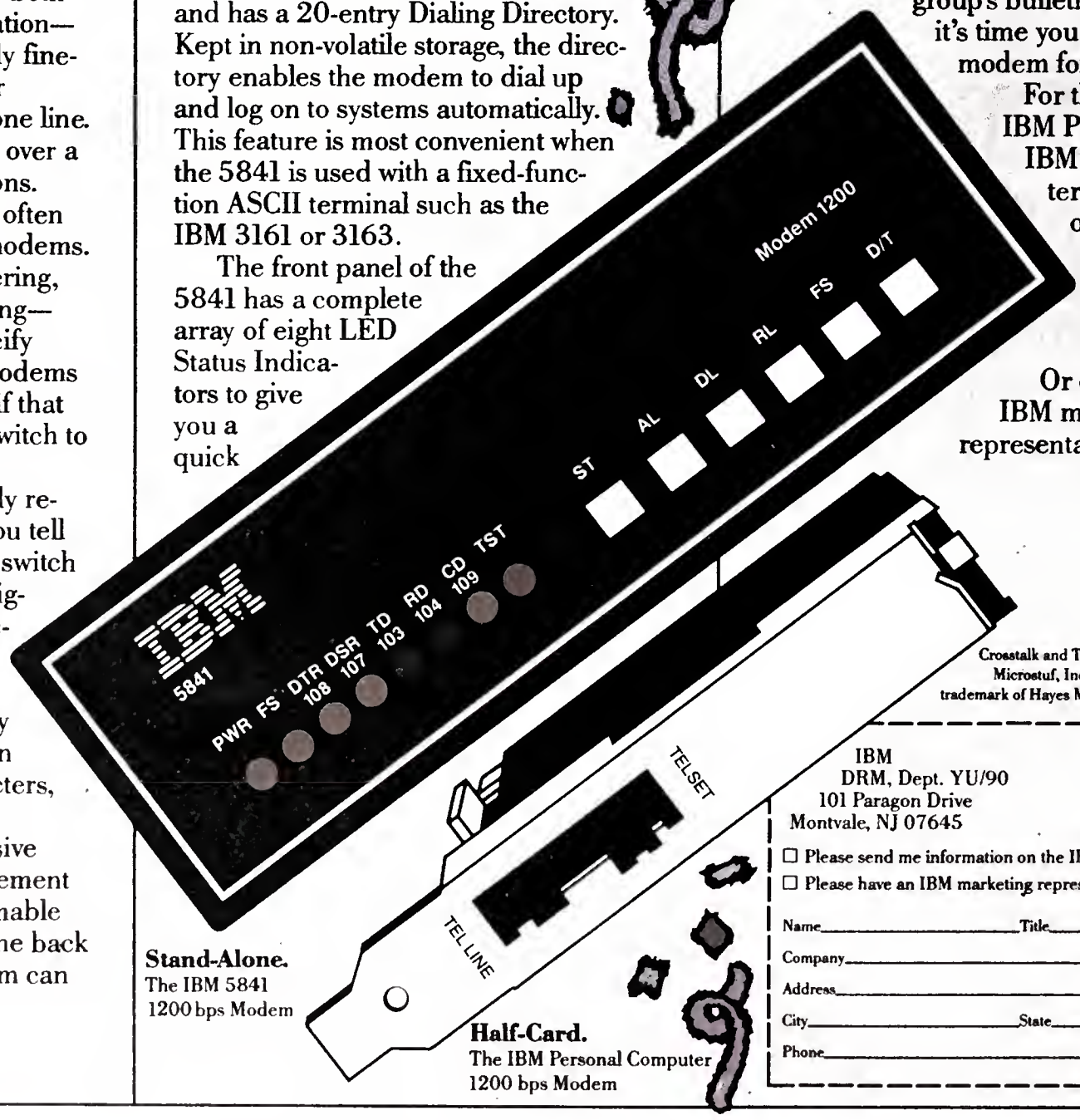

Stand-Alone.
The IBM 5841
1200 bps Modem

Half-Card.
The IBM Personal Computer
1200 bps Modem

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Languages step back, go ahead

From page 31

commitment to a fourth-generation language is to enhance the performance of "transaction-bound" applications — applications that must execute a set volume of transactions.

Users experienced in developing production applications in a fourth-generation language often prototype and then test. Testing may expose bottlenecks, where the demand for data base access exceeds the volume comfortably supported by the fourth-generation language, slowing response times to an unacceptable level. Those procedural bottlenecks can be implemented in a lower level language such as Cobol or assembler to bring response time up to par.

For less demanding applications such as query and reporting, fourth-generation languages integrated with a data base management system offer clear advantages over Cobol.

Instead of requiring an MIS professional to write Cobol programs that extract data from various sources, end users write language statements that perform the extractions and data base calls under the covers. Here is where the astronomical productivity gains of more than 10:1 vs. Cobol are primarily being achieved.

Vendors are responding to user demands for greater performance from the higher productivity languages in a variety of ways. Code is being precompiled or embedded with tokens — which point to subroutines during execution — to cut down interpretation at runtime. In some cases, procedural code is being offered in addition to nonprocedural. But most vendors now say their language will never be as efficient as compiled Cobol code. Most serious users of fourth-generation languages seem to have sacrificed performance in favor of the productivity gains. Performance is not the issue.

As they enter this more mature phase, it is time for the fourth-generation languages to increase market share and further penetrate the user base. If they don't, they risk losing ground to the next generation of application development software that combines a fourth-generation language with other tools like an application generator and personal computer windowing capability.

A key challenge for vendors is to make their fourth-generation languages truly exploit the power of personal computers. By aiming at this market, the vendors can help data processing managers looking for ways to cut the applications backlog and satisfy end users who have personal computers on their desks but limited ability to solve business problems owing to a lack of software.

Some vendors have full personal computer versions of the languages, and most others are developing such versions. These powerful personal computer software tools are the likely forerunners to packages embued with artificial intelligence that will gracefully guide users through the development steps. Such programs are a long way off.

Except for the medium-size shop with simple needs, users today are not likely to find the total solution in one fourth-generation language product. Morgan Stanley's Abbey advises, "The key is to make sure the products you get can be integrated to provide a single solution to the end user. He just wants to press a button on his terminal and get the answer."

Software out for Cyber processors

From page 31

The tool appears to make a variety of user-developed Fortran applications available to customers interested in running a Cyber 180 system.

FCON will identify code that cannot be automatically converted and generates a listing file with diagnostic messages to simplify manual conversion. FCON is priced between $60 and $150 for a monthly lease or $1,000 to $2,000 for paid-up license.

Software vendors that agree to participate in the ISV program will convert or enhance existing applications to run under NOS/VE in return for CDC's technical and marketing support services and, in certain cases, financial incentives. CDC will provide discounts of up to 40% to participants on Cyber 180 Model 830 development systems and a variety of conversion support services.

The first two packages available to users through the ISV program are Pafec Ltd.'s Program for Automatic Finite Element Calculations (PAFEC) and the Numerical Algorithms Group Fortran Mark 11 Library from Numerical Algorithms Group Ltd.

PAFEC, a tool for use in computer-aided design, allows an engineer to solve complex problems in statistics, dynamics and heat transfer. It is a three-dimensional, multipurpose linear and nonlinear system designed for use with large-scale computers in CAD. It combines engineering key words with free-format input so the system can be used by engineers with different expertise levels. It is priced at $35,000 plus a 12% annual maintenance fee.

The Mark 11 library is a programmer productivity tool that allows a user to choose from the menu of a library of previously tested subroutines. It features more than 500 mathematical and statistical routines for developing and maintaining applications for research engineering, planning and statistical analysis, the spokesman said. It is licensed annually at $1,800.

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SOFTWARE & SERVICES

Aerospace firms join venture

By Bryan Wilkins

WASHINGTON, D.C. — Twelve aerospace companies with large investments in the growing use of software in U.S. defense systems have established a joint research venture called the Software Productivity Consortium.

To be located in Reston, Va., the Consortium aims to develop reusable applications software components and to develop knowledge-based systems. The group's annual budget will be $20 million.

The consortium is composed of Allied-Signal Corp.; Boeing Co.; Ford Aerospace & Communications Corp.; General Dynamics Corp.; Grumman Corp.; Lockheed Missiles & Space; McDonnell Douglas Corp.; Northrop Corp.; Science Applications International, Inc.; TRW, Inc.; United Technologies Corp.; and Vitro Corp.

Harris Corp. and Martin Marietta Data Systems have also indicated their intention to take part in the consortium.

Transfer engineering results

The research facility will initially transfer the results of its work in software systems engineering to its limited-partner member companies. The development of reusable software components and prototyping software will be the first tasks of the consortium, with a two year start-up period expected before products are delivered.

According to a spokesman, the consortium was founded as a way to control the escalating costs of developing software for the U.S. Department of Defense.

The consortium cited estimates by the Electronic Industries Association showing demand for mission-critical software jumping from $5 billion to $6 billion in 1982 to more than $32 billion annually by 1990.

BCS effort targets systems modeling

SEATTLE — Boeing Computer Services Co. (BCS) has embarked on an effort to develop an expert system for mathematical modeling, according to BCS's national product sales manager, John Corrie.

BCS's knowledge engineers are currently interrogating recognized experts in mathematical modeling and are codifying the results for eventual inclusion in the proposed system's knowledge base, Corrie said during a recent BCS press briefing.

When complete, the system will be used in-house by Boeing Co. to support its aircraft design activities and will also be sold externally to the firm's customers, Corrie said.

The system is unlikely to be released commercially for at least another two years.

— Jeffry Beeler

IBM mainframes get file compressor

Prime Factors, Inc. of Oakland, Calif., has introduced a data compression system for IBM mainframes and plug compatibles.

Compact/LZW compresses files for tape and disk storage. The product is independent of operating systems and disk-access method, a spokesman said. Compact/LZW operates under IBM's DOS/VSE, OS/VS1, MVS, MVS/XA and VM.

The system has the following compression percentages: 55% for English text, 80% for Cobol and other source languages and 35% for object code, a spokesman said.

Compact/LZW, available now, sells for $2,500 per CPU.

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End users, DP managers must keep communications open

By James A. Martin

HOUSTON — While end-user programming in many cases is helping to overcome such persistent problems as applications backlogs, a lack of communication between end users and DP and senior managers can create turmoil in a company's efforts to maintain DP standards and to plan accurately for MIS needs, according to Murray Pomerantz, manager of market information and analysis for United Airlines in Chicago.

Pomerantz, speaking at the Data Processing Management Association conference recently, said companies, when planning MIS needs, will often not take end-user programming into consideration. "That's because they aren't aware of what the end users are doing. There needs to be an exchange of ideas on what end users are doing and where they're heading. That is just not happening enough."

A mutually satisfactory approach for end users and DP managers would be helpful because otherwise, Pomerantz said, "no one is happy." End users do not want to be bound by companywide standards, while DP managers do not want to compromise those standards.

"But somehow, you have to come up with some set of guidelines," he added. If an end user develops an application or program that does not conform to the company's standard and has not adequately trained other end users, DP management could be hard-pressed to support that application should that user leave the company, he said.

Keeping current on products

Information centers that serve end users must strive to keep current on what products end users are using, the speaker said. Information center staff "are called in to put out the fire when an end user has a problem with not understanding [Lotus Development Corp.] 1-2-3," Pomerantz said.

"The experts are out there consulting, helping the users out, but they don't program applications themselves. There are end users who have been doing this for years, who have built complex systems and who know more than the company experts," Pomerantz said.

Effective education and support strategies are important in the success of end-user programming, Pomerantz added. Senior and middle managers must also be trained to understand the benefits, costs and risks of end-user programming.

"All too often," Pomerantz continued, "a senior executive finds out about an end-user program because of a disaster occurring, rather than from something positive."

One person must be responsible for overseeing the end users, the speaker said. "It can't be someone from the users' side," Pomerantz said. "It must be someone with a global corporate view so he can help senior management understand what's going on and can oversee the applications development."

In addition, Pomerantz exhorted end users to "expose yourselves. Let senior management know what's going on. Ask for help to control and manage your programming; define more clearly the roles and responsibilities of auditors, the information center and the traditional applications programming people. Educate people at all levels and get top management involved."

Pomerantz said more end-user programmers are moving toward hybrid developments with the DP department.

"There are certain applications that best lend themselves to being done by the end user, while delivery of that data, from which a system is going to live and thrive, is best handled by the DP side," he said.

DBMS upgrade out for VAX

Software House of Cambridge, Mass., has announced Version 5 of its System 1032 relational data base management system for Digital Equipment Corp. VAX processors running under IBM's VMS.

The enhancements are said to include extended reporting facilities with elastic-default and dynamic-join features. The elastic-default feature allows users to call in text, variables or procedures at any report control breaks. Joined printing allows the display and summarization of data from multiple data sets.

The expanded reporting facility of Version 5 is integrated into the System 1032's fourth-generation language. The language is nonprocedural and includes a conversational query language and a data dictionary.

Version 5 of System 1032 also adds automated recovery and record-level security capabilities.

Version 5 of System 1032 also features automated journaling/recovery and extended data security features. The extended data security adds value-based and record-level functionality to System 1032's data set and field-level security features. DP managers can deny access to individual records based on field value.

The System 1032 relational DBMS ranges in price from $8,000 for the Microvax to $80,000 for the VAX 8600.

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Comprehensive security system crucial to corporate protection

Inventory, data flow, accounting controls key

By Neil L. Solomon
Special to CW‡

The issue of computer security — protecting equipment from theft and damage and maintaining the integrity of data both from error and intentional manipulation — boils down to corporate self-protection.

A recent survey of large and small companies conducted by the American Society for Industrial Security showed that 65% of the companies surveyed have some type of computer security program. While this figure indicates awareness of the importance of computer security, it does not measure the sophistication of each company's program. Some say they feel they are sufficiently protected by keeping their mainframes behind locked doors.

Recently, with the explosion in the use of microcomputers and word processors and their increasing capabilities for mainframe uploading and downloading, computer security has become more complex. Sensitive information once stored solely on the mainframe is now found in unlocked offices throughout the company.

And as people become familiar with how computers work and gain greater access — either authorized or unauthorized — to data, the company becomes more vulnerable.

A major problem with most corporate computer security policies is that they are not comprehensive. Also, different people are responsible for different areas. For example, an executive with a desktop can have sole responsibility for the protection of that hardware and a set of storage media while a different person is responsible for mainframe protection.

A primary reason for this is that the company's traditional source of protection, the central security department, is probably not equipped to handle the technological aspects of computer security. In the American Society for Industrial Security survey, only 35% of the companies with a computer security program place the responsibility for it with their security departments. More frequently the responsibility is kept in the hands of information systems personnel.

Developing and maintaining an effective and coordinated computer security program requires the expertise of different specialists. A well-designed security program typically grows out of an analysis of three overlapping factors:

■ Physical security. This includes taking inventory of all equipment and assessing its vulnerability in terms of location and access. Surprisingly, many companies do not know exactly how much equipment they have.

Physical security assessment encompasses potential dangers from fire and water damage as well as theft and intentional or unintentional damage by operators or other employees. And it includes the data stored on magnetic tape or disks and printouts.

Controls that come out of the assessment can include locks, guards, equipment isolation, alarm systems and restricted access procedures. Data protection can include off-site storage of backup tapes and tape archives.

■ Investigating accounting. This function finds where potential fraud could occur within computer operations. It identifies the sources of data input and retrieval. It also shows on which data areas the company is most dependent and the data that should be considered the most sensitive. Further, it tells which areas of the data input and retrieval should be auditable and to what degree.

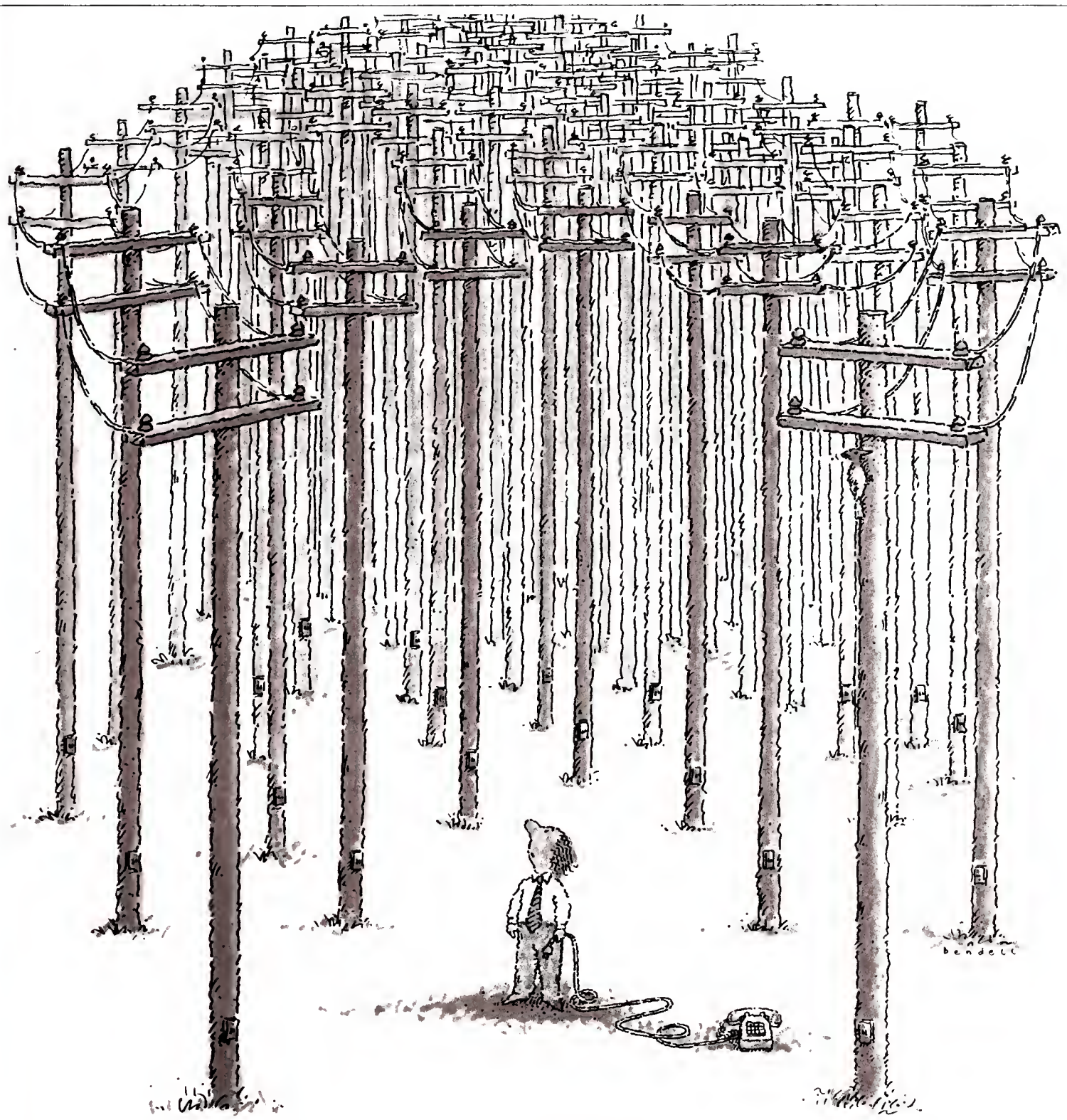
■ Data flow controls. Based on the accounting analysis, an assessment of the security weaknesses inherent in currently installed and proposed software is made. Data flow controls are then built into the system, either through software or through data security products.

These controls could include limiting uploading and downloading access through codes and passwords. Or they could track accountability for all input and retrieval on certain files. And, for systems with telephone hookup, safeguards against outside intrusion would be necessary.

The controls that are developed from a computer security audit are people controls. And since about 90% of intentional computer tampering, as well as error, is committed by employees, they are employee controls.

At the heart of every effective computer security program is the careful selection and screening of employees. Background checks should be made on people who will have access to sensitive data. As with any security background checks, however, care should be taken to conduct the investigation so that lawsuits will not result if a prospective employee is not given the job because of information found during the investigation.

Solomon is vice-president of technical services for Guardsmark, Inc. of Memphis, a security service and consulting company.



sonal calls that can squash the company kitty —you can keep track of bills and chargebacks.
Call us.

We'll break down your current phone bills. We'll recommend the stingiest carriers. (After all, we built our name managing call costs.) We'll dazzle you with the power of CBX II, the wizardry of advanced routing, the thrill of nationwide service and support.

Not surprising.

We're the folks who taught phones and computers and people to work together on one system. Today, next year and into the next century.

Let's talk. Remember, you're not out of the woods, yet.

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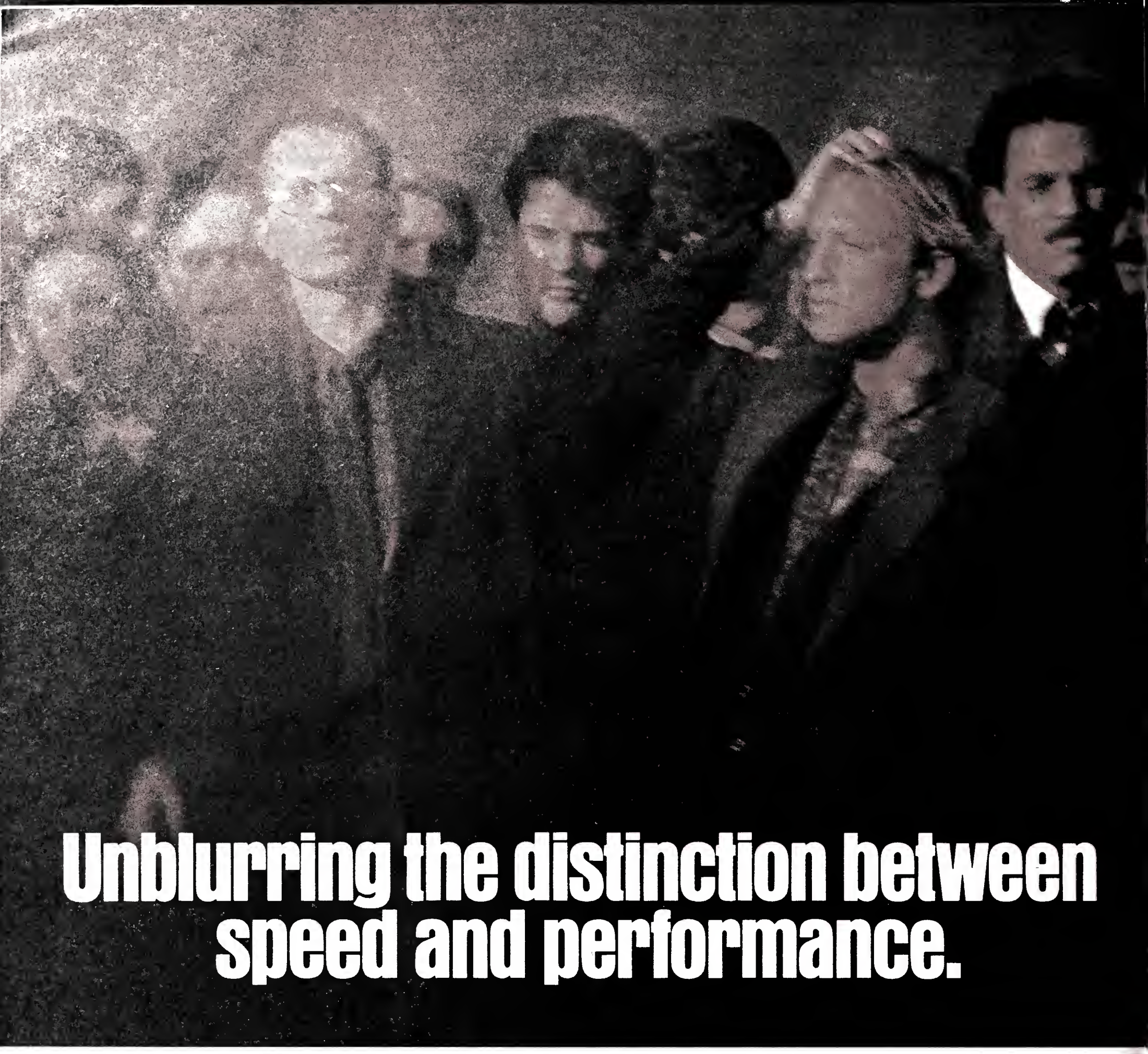
800-538-8154. (In Alaska, California and Hawaii, call 408-986-3025.)



Unblurring the distinction between speed and performance.

In the torrid race to claim the fastest high speed modem, many companies advocate basing your buying decision on one thing: speed. What's happened, unfortunately, is that these speed claims are beginning to blind people. So much so, in fact, that modem purchasers are losing sight of the difference between modem speed and data throughput. Between addition and integration. And between out-of-pocket expenditures and intelligent investments.

Codex would like you to take one step back for just a minute. Allow us to submit the following questions.

What level of performance do you really want out of a modem which operates at 19,200 bps? How much more efficient will it make you? How much throughput can you expect? What support, such as line conditioning, centralized network control capabilities and staffing will you need to maximize efficiency and control costs?

These are the *most important considerations* when evaluating a high speed modem. *Any* high speed modem.

Especially ours.

Introducing the Codex 2680

It's the thoroughbred of 19.2 kbps modems. We say this so unequivocally

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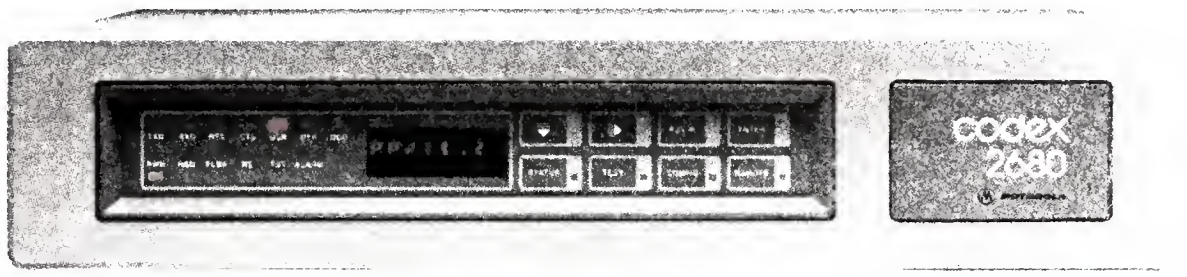
because the Codex 2680 fully answers the most important considerations. And because it is not a revolutionary design, but rather an evolutionary one, based on the technology of a series of modems which have remained the most technologically advanced in the industry since they first appeared: the Codex 2600 Series.

increasing expenses or staff resources.

You can use D1 lines instead of C-conditioned lines, so you can achieve substantial savings in monthly leased-line costs. From day one.



The new Codex 2680 19,200 bps high speed modem.

High speed modems vs. high speed communications

The Codex 2680 sets new standards for performance and reliability among very high speed modems. By combining the Codex proprietary custom VLSI design and the power of the Motorola 68000 microprocessor, the Codex 2680 provides the highest and most consistent level of data throughput of any 19.2 kbps modem available.

This superior performance is achieved in a number of ways. By utilizing enhanced 64-state 8-dimensional Trellis Coded Modulation (64 x 8 TCM), one encoding bit is interwoven with every 28 bits of the original transmitted stream. The result, quite simply, enables the receiver to both interpret and select the best sequence of bits which most accurately represent the data transmitted. Codex also positions the error-correcting data in a smaller signal constellation, thereby making it less susceptible to line disturbances.

In actual use the Codex 2680 delivers 99.9% error free data over more than 90% of standard 3002 D1 conditioned lines at 19.2 kbps.

The Codex 2680 also incorporates Codex's Adaptive Rate System (ARS). This feature eliminates the need for manual monitoring and reconfiguring of data rates, optimizing throughput under all line conditions.

The big payoff

Speeds of 19.2 kbps allow you to realize dramatic increases in efficiency *and* productivity. Without

And these savings add up. Fast. With its standard 2-channel multiplexer, you can eliminate extra lines. For example, by combining two separate 9600 bps circuits into one leased-line at 19,200 bps, typical savings for a New York to LA link are greater than $24,000 per year.* And that's just in leased-line charges. You'll save more on hardware as well.

What's more, the Codex 2680 offers complete network management capabilities for monitoring and fault isolation. It can operate independently or with your present central site Codex network management and control systems, to ensure greater network availability.

In short, it's a modem that's really a true network system resource.

It's all perfectly clear

Another important feature of the Codex 2680 is the fact that it is shipping right now. Not tomorrow. Now.

If you still have questions or would like a product demonstration, simply call **1-800-426-1212, ext. 227.** Or write Codex Corporation, Dept. 707-227, 20 Cabot Boulevard, Mansfield, MA 02048.

The quicker you do it, the faster you'll be achieving what you really want out of a high speed modem.

Performance.

codex
MOTOROLA

*Based on average installation and leasing charges for 3002 D1 circuits as of 10/85.

History In The Making

Everyone in the high technology industry knows of, knows about or at least acknowledges the existence of Leading Edge Products, Inc. The company which recently celebrated its fifth year in the high tech business has slowly climbed away to the rank of the personal computer market — much to the surprise and concern of its competitors.

A closer look at the history of the company however reveals a unique marketing approach that has not only survived the toughest years of the personal computer industry, but has grown, gained and established independent credibility.

Way back in the spring of 1980 five people with varying business and marketing backgrounds discussed the opportunities that existed in the then blossoming personal computer industry. They uncovered what turned out to be one of the most productive avenues ever pursued in the entire history of the industry: a single distributorship catering exclusively to the then hundreds (now thousands) of independent retail computer outlets.

The concept was to make computer products more affordable to the public through mass production very much the way the Ford Motor Company and with the automobile — via economies of scale. The founders of Leading Edge hoped to free the minds of the masses with personal computer products the same way the car physically freed the bodies of the masses when automobiles became an affordable reality.

They began with a product we'll all remember, Memorex disks. Using a few phones, a few people and lots of directory assistance, the fledgling company went into business. Six months later, Leading Edge was the largest distributor of the product.

Hundreds of independent retail outlets, ranging from mom and pop dealerships to multi-store organizations, absolutely loved the convenience of the over-the-phone sales representative. Orders were shipped fast, no time was wasted watching live sales pitches, and each call represented a direct connection to the company. Although selling high tech equipment over the phone was considered ludicrous at the time, it proved to be a very accurate, economic, and effective strategy.

The product line began to grow. The Elephant Memory Systems Division was formed to sell Elephant brand floppy disks in 1981. Later that year, Leading Edge began selling C Itoh printers and was soon granted exclusive distribution rights.

The dealership network grew tremendously and so, consequently, did the company. By mid 1981 there were over 50 telemarketers calling nearly 4,000 dealers. The annualized sales volume had exceeded $50 million by the end of Leading Edge's third year in business.

The next year brought on some changes for Leading Edge, all of which were part of the company's long term plans.

First, Leading Edge began producing software. Millions of dollars went into the research and writing of Leading Edge Word Processing to make it powerful, easy to learn, and affordable. The successful package became all three.

Then Leading Edge sold the C Itoh printer division to C Itoh and the Elephant Memory Systems Division to the Dennison Manufacturing Company. These moves were made, as part of the corporate strategy, to make the transition from peripherals to personal computers.

Late in 1983 Leading Edge announced its first personal computer, the IBM compatible Leading Edge Personal Computer. The Model "M" was the first Japanese-made IBM compatible ever to sell into the United States.

Daring advertising claiming "The day the IBM PC Became Obsolete" began appearing in every computer-related publication on the face of the earth. Because of its superiority over the IBM PC and the low price tag, sales figures multiplied exponentially. Reviewers raved, dealers were delighted, and consumers craved. Shelves emptied faster than deliveries filled them.

Earlier this year, Leading Edge announced a co-design and exclusive manufacturing and marketing agreement with the multi-billion dollar Daewoo Corporation of South Korea. Leading Edge product marketers and Daewoo manufacturing engineers sat down and designed what industry specialists now call one of the best designed machines in the history of the industry. (See: Consumer Reports 10/85, PC Week 10/8/85, PC Magazine 9/15/85).

Leading Edge will never be content resting on its laurels. Although the Model "D" is forecast to be one of the most successful personal computers of the year, research goes on at Leading Edge. The company continually monitors the market via their established dealership and responds with the products in demand.

Support Proves Critical To PC Sales

A few short years ago, when Leading Edge Products, Inc., was a young and growing personal computer product company, someone thought up the idea of offering the end user support.

From that precedent setting day on, Leading Edge has remained an industry leader in the support arena. A look back tells the story.

Elephant brand disks, one of Leading Edge's earlier products, were the first to be guaranteed for life.

Later, Leading Edge printers were the first to come with a full year warranty during a time in which most vendors didn't concern themselves with post purchase difficulties after 90 days.

Repair centers were authorized by Leading Edge to honor the warranties at a time of several per day, until there were hundreds spanning the continent.

Support became such a major selling point for Leading Edge, it soon carried over to their other product lines.

Leading Edge software, for example, comes with a phone number which you can call if you have a problem. The service is free, and so is the phone call. Both come with the software as a standard feature, and last a lifetime.

When Leading Edge began marketing personal computers, the support tradition continued.

Again, while most other vendors don't offer any warranties and others charge for it, Leading Edge offers a full year at no charge.

And the company's new Model "D" Personal Computer comes with an unprecedented 15 month warranty.

The technical support hotlines carried over to the personal computers too. And users can now call, toll free, and talk to qualified technicians about their hardware products, whether it be about something as simple as plugging it in or as complex as adding an internal disk drive.

Leading Edge was a pioneer in the support end of the industry. Today, they continue with this spirit, out supporting most other companies. Even though they don't charge extra for it, the service is peerless.

Product Definition: Know Thy Market

The success of Leading Edge Hardware Product, Inc., designer and marketer of personal computer products can be attributed to the company's thorough understanding of the marketplace.

While most other high tech firms try to muscle new products into the market with large advertising budgets, Leading Edge carefully monitors the market and provides only the products that are in demand.

Leading Edge utilizes its established nationwide dealer network to keep in touch with the consumer market. Each day, Leading Edge telemarketers receive an average of 3000 phone calls while placing 3000 of their own. Every single piece of information is listened to, analyzed and evaluated.

Leading Edge has also implemented what is known as an "information agency" where an entire staff is dedicated to the research of the high tech market. The researchers scrutinize every single high tech publication from around the globe. Their PC's tap every available database, and their phones are constantly ringing. The information they have compiled rivals that of a good sized library.

Advertisement

Product Mix Readied, Aimed, Fired At Defined Market

Then there are the product evaluation and quality assurance people. These people rigorously test everything both from what Leading Edge sells and what the competition is selling.

They melt chips, crash programs and drop boxes until they understand everything there is to understand about a product. Their thorough understanding of every single product is relied upon by Leading Edge marketing people religiously.

All of this constant and thorough contact with the marketplace provides Leading Edge with fresh, accurate and otherwise unobtainable information upon which sound marketing decisions are based.

The fact that Leading Edge has yet to market a flop, and that their problem tends to be keeping products on the shelf — not moving them off — proves this method highly effective.

Take a look at Leading Edge's newest personal computer, the Model "D". The design of the Model "D" addressed the needs of the marketplace so accurately, sales figures are exceeding even the wildest forecasts. Predictions have already been made that Leading Edge will assume one of the top three spots among personal computer manufacturers.

With anticipated 1986 calendar year sales of $250 million, predictions have already been made that Leading Edge will assume one of the top three spots among IBM compatible personal computer marketers.

All that really matters is that Leading Edge is one high tech company that is in tune with the market. Keeping in tune keeps this company at the Leading Edge.

Leading Edge personal computer products are unlike any other in the high tech industry. Not because of technical wizardry and useless bells and whistles, but because they break the barrier that the two distinct and separate market giants, namely Apple and IBM, have imposed on the rest of the world.

Leading Edge products simply offer IBM performance at Apple prices — something no other manufacturer has ever done.

Apple had been doing a fantastic job catering to the home and educational markets because of the low price and simplicity of their products.

Who's Who At Leading Edge

There is something different about the people at Leading Edge products.

Embellishing the staff of hard core "techies," marketing hugwigs, and seasoned sales supervisors, are ordinary people.

Behind some keyboards, desks and telephones are not your typical computer type people, but instead, ex-teachers, ex-Marines, ex-policemen and other unusual ex-backgrounds.

Supporting staff members are hired for their communication skills, ability to learn, and eagerness to grow, not MIT degrees. This strategy seems to make sense when one considers that 90% of this company's business is communicating.

As the company continues to grow, a greater diversity of people accrue. The success of Leading Edge indicates that this unusual approach has garnered some of the best professionals in the industry.

IBM, on the other hand, moved into the business segment of the market where some managers trade price considerations for security — capitalizing on their mainframe stronghold and product sophistication.

Leading Edge took advantage of this market segmentation by offering inexpensive products that could outperform IBM standards while adhering to IBM compatibility.

The decision to emulate the industry standard allows Leading Edge to capitalize on the thousands of IBM software packages and peripherals that already populate the market.

But Leading Edge products often take the compatibility one step further by outperforming the products they are butting heads with.

Leading Edge's new Model "D" PC, for example, is priced far below the IBM PC, yet the Model "D" comes with several features the IBM doesn't.

The "D" is built around a unique motherboard which houses monochrome and color graphics output, parallel and serial ports, and room for expansion up to 640K — all of which are usual extras in the world of IBM and compatibles.

The Model "D" exceeds IBM performance standards while remaining as affordable as the non-IBM compatibles, like the Apple.

People by the thousands are beginning to understand the impact of that accomplishment on the personal computer market.

Homes, schools, small-size businesses, medium-size businesses, large-size businesses, local, municipal, state and federal governments, and fortune companies alike, appreciate what Leading Edge has done. In fact, 40 Fortune 400 companies already own Model "D"s.

Another Leading Edge personal computer, the Model "M" is similarly positioned. The Model "M", a bigger and faster unit than the Model "D", also upholds the Leading Edge price/performance philosophy.

Retailing at a price palatable to the lower end of the market, the Model "M" again outfeatures the IBM PC. The high speed microprocessor and six expansion slots are a couple of reasons why.

The same can be said about software. Leading Edge Word Processing is priced at about half of what the market will pay for a similar package.

Yet, Leading Edge Word Processing stands up, feature-for-feature, against any of the other big-name packages. On top of that, it's as easy to use as the inexpensive ones.

Nutshell Information Manager, another powerful Leading Edge software package, costs little more than a metal file cabinet and is almost as easy to use. The critics have had nothing but good things to say about it.

The list goes on.

And to make things worse for the competition, Leading Edge always backs their products with the best support in the industry.

The hardware, and software, warranties plus the free lifetime technical support for both product lines, make Leading Edge the undisputed leader in terms of support.

The market strategy of Leading Edge becomes sparkling clear: make the best IBM compatible products, sell them at the best prices, and back them with the best people.

Professional-Level Power

*** Consumer Reports says:**

"The Best Buy among the IBM-compatibles is the Leading Edge Model "D". It comes with a high-resolution monitor and the circuitry necessary to display very sharp text as well as monochrome and color graphics. And it has enough ports and expansion slots to build just about any computer system you might want in the future."

*Consumer Reports is not affiliated with Leading Edge Products, Inc. and does not endorse Leading Edge's products or any other products.

at a Price for Everyone.

The Leading Edge® Model "D" Personal Computer
Full IBM® Compatibility. $1495. Complete.

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Call us for the one near you.

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MICROCOMPUTERS

SMALL TALK
Morton Rosenthal

New answers from Q&A

We've heard a lot about the merits of artificial intelligence. Now, finally, we're seeing AI incorporated into a highly touted software product that purports to make personal computing not only easy but fun. Has AI actually arrived — or does it still need work?

Q&A from Symantec Corp., a $299 package for IBM Personal Computers, is a file manager with a built-in word processor that has potential to bring new meaning to the term "user friendly." This new package has the simplicity of Software Publishing Corp.'s PFS series — or the IBM Assistant series, which is nearly identical. It even employs a similar user interface.

But what makes this new product really different is its Intelligent Assistant, a natural language front end that lets you query and manipulate the data base by making your requests in plain English.

For example, the Intelligent Assistant will allow you to retrieve data by typing in the statement, "Show me all Midwest region sales representatives whose sales are greater than their quotas."

The cursor then flashes across your words, pauses where necessary to ask for a clarification or additional information and displays a formal interpretation of your request. The request above would generate the command, "Create a report showing sales repre-

See **NEW** on page 50

Rosenthal is chairman of Corporate Software, Inc. of Canton, Mass., a leading supplier of personal computer software to large corporations.

Guru AI environment out

Expert system shell links to standard applications

By Eric Bender

LAFAYETTE, Ind. — Widening the horizons of the all-in-one microcomputer software program, Micro Data Base Systems, Inc.'s (MDBS) new Guru program adds an expert system shell and a natural language front end to the usual collection of applications.

Priced at $2,995 and scheduled to ship this month for the IBM Personal Computer, Guru is "an artificial intelligence environment for business systems," claimed company President Gary Koehler. The software is designed to let users create small, easily modified expert systems for typical business problems and to link those systems tightly with standard desktop applications.

Guru avoids five major drawbacks to most other expert system shells, according to Koehler. These include the requirement to work in LISP or Prolog, which he called "elitist languages"; a lack of integration with normal business processing; a need for specialized hardware; insufficient flexibility; and a demand for special training.

"We don't feel there should be 'knowledge engineers,' " Koehler said. "We're not limiting ourselves to the professional expert; we feel that everyone in the company is an expert."

As one example, Koehler noted that "when you think of an expert, you don't think of a shipping clerk," but MDBS used Guru internally to build an expert system that takes the load of answering questions off its overnight shipping manager. "The system has about 15 rules, and it handles about 75% of the problems he's hit with," Koehler said.

This setup "makes a company's intangible assets tangible, and it gives consistent advice," Koehler commented.

In another internal application a Guru program expedites order entry, which MDBS handles on micros. "Our big, hairy

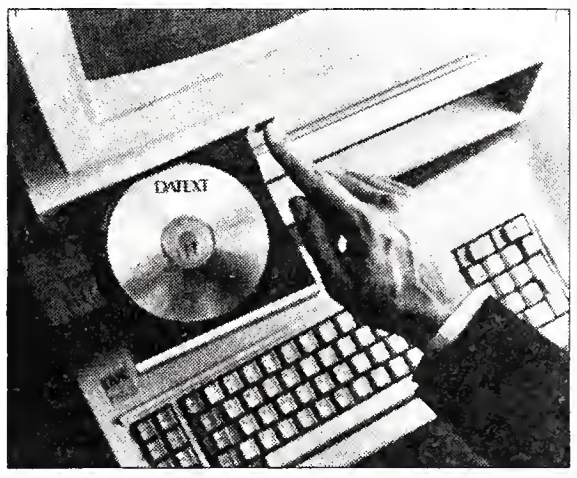
See **GURU** on page 51

Compact disk data base debuts

By Mitch Betts

WASHINGTON, D.C. — Datext, Inc., a new firm in the data base industry, made a splash at the Information Industry Association's annual convention recently when it introduced the first comprehensive business data base stored on compact optical disks. The company also introduced hardware and software that would enable users to retrieve the data.

The Datext product, targeted at financial researchers and Fortune 500 firms, is a data base of detailed information on U.S. businesses, delivered to users in compact disk read-only memory (CD-ROM) form, with monthly updates for an annual subscription fee. The data can be transferred to a personal computer — and such popular programs as Lotus Development Corp.'s 1-2-3 spreadsheet — for analysis,



The Datext data base is presented to users in compact disk read-only memory form.

manipulation and reports.

Subscription prices range from $9,600 to $19,600, depending on how much data the user wants. For the fee, users get a CD-ROM disk drive, a controller card and cable, maintenance, software license, documentation and one to four CD-ROM disks.

An IBM Personal Computer AT, XT or

See **COMPACT** on page 50

INSIDE

Video-7 launches a graphics board compatible with both the IBM Enhanced Graphics Adapter and the Hercules Graphics Card/**48**

NEW THIS WEEK

- Hewlett-Packard introduces a daisywheel printer
- Unisource Software ports Ryan-McFarland's RM/Cobol to Venturcom's Venix/86 operating system

■ For more on these and other new products, see pp. 111-136.

INSTANT ANALYSIS

"IBM does not talk about things like site licensing, although the rest of the world may be kicking and screaming about it."

— Kathleen Lane
Dataquest director of software services

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IBM SQL/DS and DB2 relational DBMS now on PC

ORACLE, the relational DBMS compatible with IBM's SQL/DS and DB2, is now available on the IBM PC/XT and PC/AT. While SQL/DS and DB2 run only on IBM mainframes, ORACLE runs on IBM mainframes as well as on DEC, DG, HP and most other minis and micros. Any application written for SQL/DS or DB2 will run without modification on the complete range of systems supporting ORACLE, including PCs.

SQL/DS and DB2 are relational database management systems; ORACLE is a relational DBMS plus an integrated set of 4th generation software tools for application generation, report writing, color graphics and network communications.

Oracle Corporation introduced the first relational DBMS in 1979. Now, ORACLE provides the only complete implementation of the IBM-standard SQL language available for the PC.

Oracle Corporation cites three principal application areas for its product's capabilities:

■ **The ORACLE Application Development Center** provides a PC-based development center for the creation of DB2 and SQL/DS applications. The flexibility of the personal computing environment is made available to programmers creating applications for use with IBM's relational database products.

■ **The ORACLE Personal Information Center** extends the Information Center concept to the Personal Computer. ORACLE's application generator, graphics, spreadsheet and other end-user tools provide a SQL/DS and DB2 compatible Information Center on the desktop.

Users can become acquainted with the facilities and power of the Information Center in the personal computing environment, and transfer their knowledge and skills as the MIS Information Center facility evolves. The ORACLE Personal Information Center provides the facilities for MIS to develop the cooperative relationship with end users so vital to the success of the Information Center.

In addition, with ORACLE on departmental superminis, users can create identical Information Centers at the department level.

■ **The ORACLE Distributed Information Center** provides an intelligent set of communication links among multiple systems, with ORACLE running on IBM mainframes and various minis and PCs.

Using ORACLE's SQL*LINK networking facility, ORACLE on such diverse systems as MVS, VM/CMS, VAX/VMS, UNIX and PC/DOS can selectively exchange database information using the full capabilities of the SQL language. Applications, portable across all environments, can be run identically on any system, and data can be intelligently extracted for use at any site.

ORACLE is currently installed on over 1000 supermini and mainframe systems around the world, as well as on thousands of PCs and compatibles. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and many government agencies.

For further information, contact Oracle Corp., Dept. C, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350.

Video-7 rolls out graphics board for IBM Personal Computers

Compatible with IBM EGA, Hercules card

MILPITAS, Calif. — Video-7, Inc., a manufacturer of high-resolution video and graphics products for personal computers, has announced the Vega, a $599 graphics board for the IBM Personal Computer family that Video-7 claims is a complete functional replacement for the IBM Enhanced Graphics Adapter (EGA).

Video-7 Chief Executive Officer Don Bryson said the Vega is available in either short- or standard-slot versions.

The device comes with 256K bytes of random-access memory and provides a resolution of 640 by 350 pixels in monochrome mode and 640 by 350 pixels with 16 colors from a palette of 64 in color, high-resolution mode.

Compatible with older IBM adapters

Bryson claimed that the Vega is first to be fully compatible not only with the IBM EGA but also with IBM's older display adapters — the Color Graphics Adapter and the Monochrome Display Adapter — as well as with the Hercules Computer Technology Co. Graphics Card.

According to Bryson, the Vega supports all popular IBM software without special drivers, including Microsoft Corp.'s Windows and Word, Ashton-Tate's Framework and Lotus Development Corp.'s 1-2-3 and Symphony.

He said that the card will support all future software offerings for the Personal Computer.

Bryson predicted that as the cost of color monitors and color printers decreases, the emphasis on the appearance of screen displays will grow.

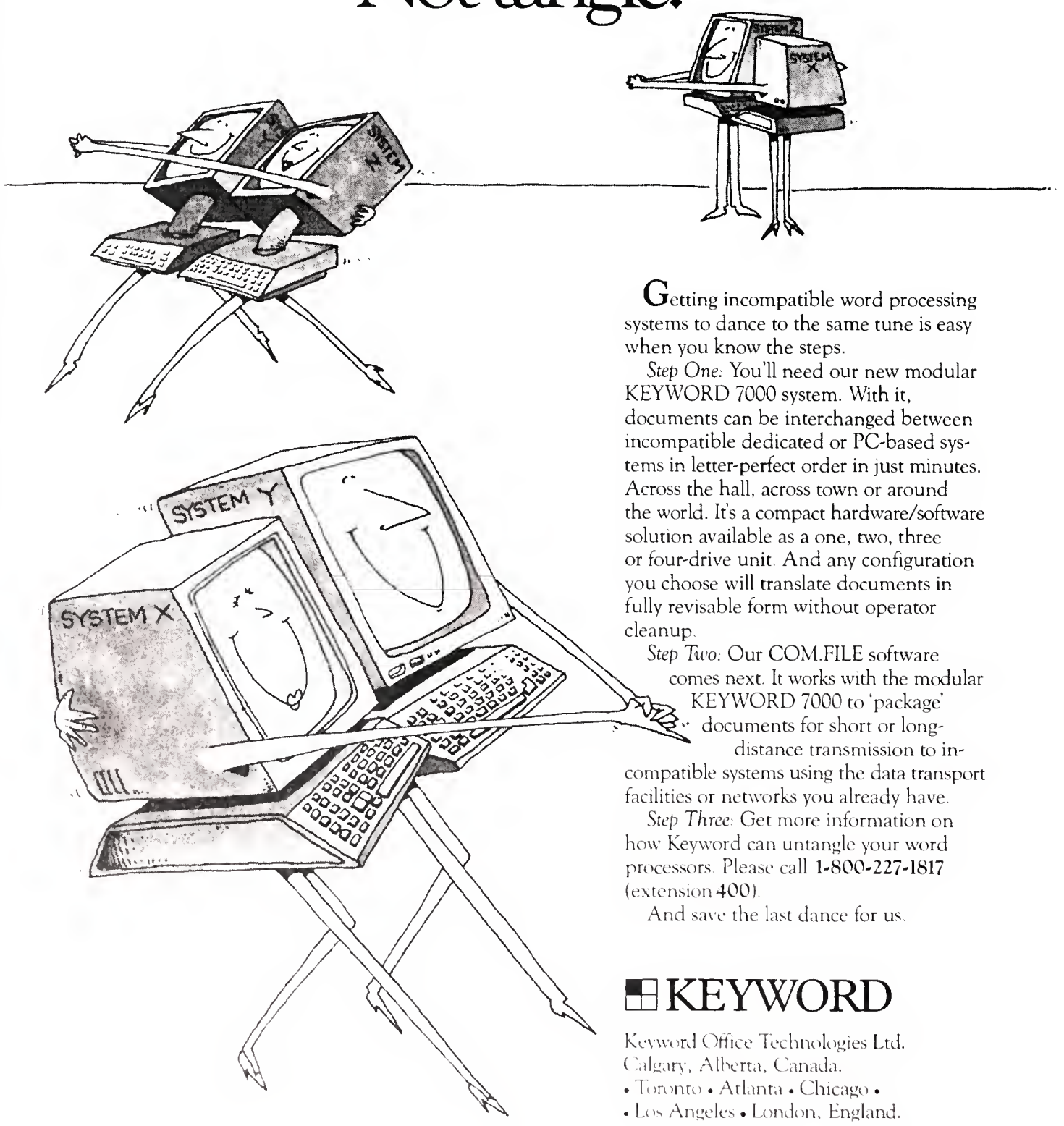
Word processors, for example, can take advantage of the color now available in different fonts. The Vega, Bryson added, will be significant in applications that mix text and graphics, as does desktop publishing.

Among other applications, a Personal Computer AT with an EGA "becomes an attractive [computer-aided design] system at the low end," according to Bryson. Other cards, he claimed, emulate but do not duplicate the IBM functionality.

Also this month, Video-7 made public a joint venture with Quadram Corp. of Norcross, Ga., for comanufacturing and marketing the Vega. Quadram said it will distribute Quadega+, a $595 long-slot version of the Vega designed for Personal Computer ATs, through its retail channels.

Video-7 plans to ship the Vega in volume this month. Quadram will start shipping the Quadega+ in December.

With Keyword, word processors will tango. Not tangle.



Getting incompatible word processing systems to dance to the same tune is easy when you know the steps.

Step One: You'll need our new modular KEYWORD 7000 system. With it, documents can be interchanged between incompatible dedicated or PC-based systems in letter-perfect order in just minutes. Across the hall, across town or around the world. It's a compact hardware/software solution available as a one, two, three or four-drive unit. And any configuration you choose will translate documents in fully revisable form without operator cleanup.

Step Two: Our COM.FILE software comes next. It works with the modular KEYWORD 7000 to 'package' documents for short or long-distance transmission to incompatible systems using the data transport facilities or networks you already have.

Step Three: Get more information on how Keyword can untangle your word processors. Please call 1-800-227-1817 (extension 400).

And save the last dance for us.

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Framework II begins to ship

Ashton-Tate recently began shipping its Framework II integrated software program for the IBM Personal Computer and compatibles and introduced an add-on financial modeling package. The Culver City, Calif., firm also announced a price reduction for its Runtime Dbrun products.

Announced in September and priced at $695, Framework II replaces the original Framework. The new package features ease-of-use enhancements and strengthened spreadsheet and word processing functions, the vendor said. Through the end of the year, users will be able to upgrade for $140.

The Financial Management package provides financial models to help users in retail or wholesale, manufacturing and service industries to conduct financial planning analyses, according to Ashton-Tate.

The software performs cash flow analysis, listing sources of capital and available cash; does break-even analyses, calculating how many units must be sold to make a profit and studying alternative forms of production and retailing; and monitors budgets and revenue performance against projections, the vendor said. Results are displayed through graphs and reports.

The Financial Management module will be available in first-quarter 1986 at a cost of $69.95. It is the third package in the Decision Maker series for Framework II, the other two being Project Analysis and Decision Modeling modules.

Separately, Ashton-Tate announced a price reduction for its Runtime Dbrun products, which are compatible with the company's Dbase II and Dbase III Developer's Release.

Both Dbrun II and Dbrun III will now be priced at $50 per unit, a reduction from the previous prices of $100 and $150, respectively.

Dbrun II and III are execute-only versions of the Dbase products, which allow the use of custom applications encoded with Runtime utilities based on Dbase II and Dbase III Developer's Release. The Dbrun products are targeted to value-added remarketers and corporate developers.

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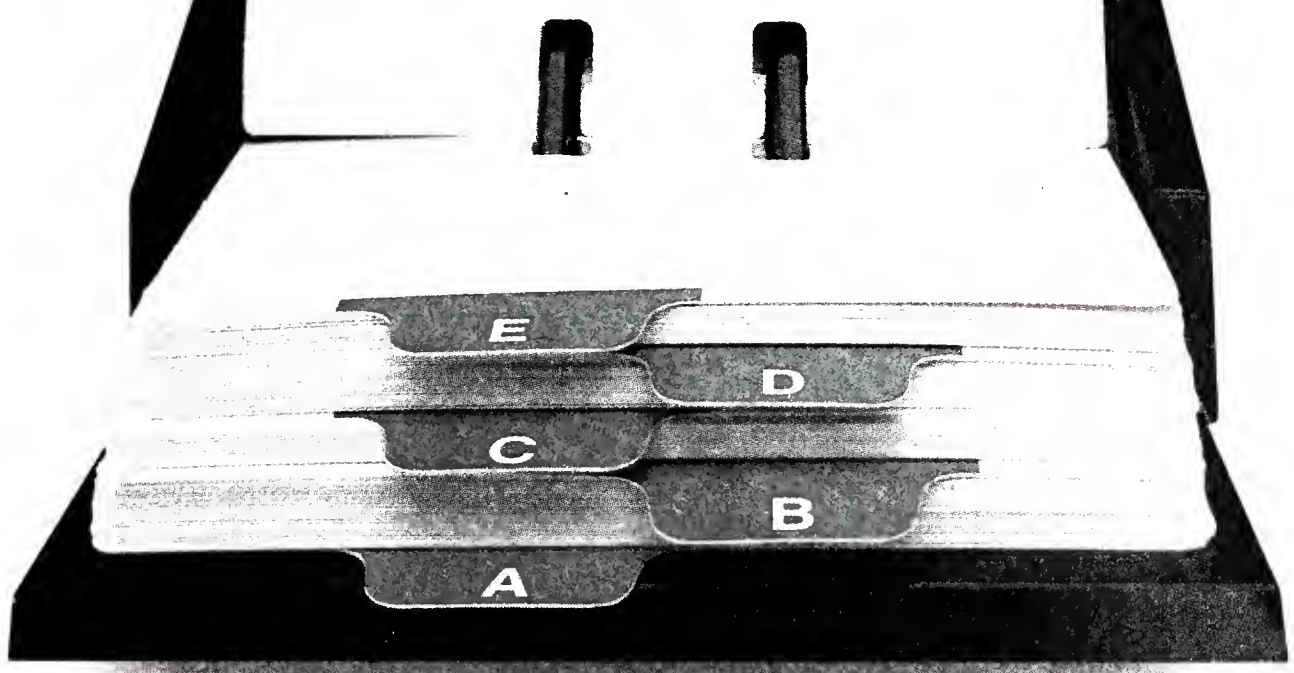

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New answers from Q&A

From page 47

sentative and sales and quotas on the forms on which region is Midwest and sales are greater than quotas."

If the program has read your request incorrectly, you can keep rephrasing it until the program gets it right. Then you give the go-ahead to retrieve the information.

Besides making your queries easier, the Intelligent Assistant does several things that until now were found only in relational data base managers but are just as appropriate for a single-file manager.

The Intelligent Assistant understands Boolean logic, which means it can handle "or" requests — such as "List all houses with swimming pools or tennis courts." It allows you to modify a field throughout your entire data base — such as, "Raise selling price by 5%" — or to redesign your data base at will.

And it can search based on a calculated field or a character string within a field — such as, "Show me all products with selling price twice cost," or "List all companies beginning with 'General.' " These capabilities make Q&A far more versatile than other programs in its class.

Just plain fun

On top of everything else, the Intelligent Assistant is just plain fun. It's the only data base product we've seen that's truly interactive. And there's something downright enjoyable in giving the program plain English commands and watching it come up with the results.

The Intelligent Assistant makes working with a data base simple, but the program is not magic. It can't respond if it doesn't understand the words you've used in your request, and with a few exceptions the program knows only the words that you've taught it. Unless your queries are extremely simple, you must first educate the Intelligent Assistant by going through a multistep process to define the words that you're likely to use.

A typical lesson is to define every possible name by which you might refer to a data field. For example, "houses" should also be defined as "homes," "dwellings," "properties" and "locations."

For advanced inquiries, the education process is a little trickier. Instead of asking for houses that have "monthly rents" of $500, you might find yourself asking for house that "lease for" $500. The program handles this request only after you've defined the phrase "leases for" as referring to the field "monthly rent."

Fortunately, if your query contains a word you've failed to define, the Intelligent Assistant does not refuse your request but instead gives you a chance to add the word. Thus you can start using the Intelligent Assistant without providing it with any formal education, and as your queries become more advanced you can train it on the job.

The data base module and Intelligent Assistant are certainly the flashiest aspects of Q&A, but the word processor should not be ignored. It's as easy to learn as PFS:Write and offers box drawing, improved temporary margins, better centering and very fast execution.

Micros to the masses?

Is Q&A a product designed to bring personal computers to the masses? No.

Mastering Q&A requires a modicum of computer savvy — no more than that needed for PFS, perhaps, but not much less either. This program is definitely not for computer dummies.

For whom, then, is Q&A best suited? We suggest two classes of potential users.

If you're a Lotus Development Corp. 1-2-3 user with an occasional need for list management or word processing, you'll find Q&A an ideal second product. It's easy to read 1-2-3 data into Q&A, and it's far easier to maintain your lists and create your memos with Q&A than it is to force 1-2-3 to perform tasks that it wasn't designed to handle. You can even transfer spreadsheet data to Q&A, manipulate it and transfer it back to 1-2-3 for further analysis.

The other group that will like Q&A is made up of PFS users, both present and prospective.

Like any other product, Q&A has its drawbacks, but it's quite impressive as the first package to bring AI to life in a practical way.

Compact disk data base debuts

From page 47

compatible, equipped with 512K bytes of random-access memory and Datext's menu-driven software, retrieves the information from the optical disk.

The business data base includes financial statistics and article abstracts on more than 10,000 companies.

"Just as spreadsheets have allowed the personal computer to become a financial analysis tool, Datext now enables the personal computer to become an information analysis tool," claimed Datext Chief Executive Officer David Roux.

Company officials, however, stressed that they see their data base as only a first source for business researchers and do not expect it to replace all other business data bases.

Datext, based in Woburn, Mass., is a subsidiary of Cox Enterprises, Inc. of Atlanta.

Guru program introduced

From page 47

discount schedule was reduced to nine rules," Koehler said. "It fit right in with our data base and text processing capabilities."

Guru beta users included a number of General Electric Co. MIS professionals who developed prototype applications. One system configured data communications for a mainframe installation (see story this page).

The expert system shell supports forward and backward chaining, gives several ways to handle certainty factors and provides a variety of environment controls. Rule sets can be stored as text and compiled for fast execution. When consulted, the expert system asks for more information when needed and explains its reasoning on request, Koehler said.

Four interfaces are available throughout Guru. The natural language interface has a vocabulary of 500 words, which users can expand. A menu-guided interface, a somewhat-English-like command language and a procedural programming language are the other options.

The horizontal applications, which can be used within the expert system environment or independently, include a relational data base manager, an ad hoc inquiry facility patterned after IBM SQL, a spreadsheet, a forms management facility, statistical and mathematical capabilities, a report generator, a business graphics facility, a text processor and a remote communications feature.

Tight integration of these features with the expert system permits Guru, for example, to access information automatically in an external data base for processing by the expert system's inference engine and then print out the results, Koehler said.

Guru also supports a range of security features and can execute standard Microsoft Corp. MS-DOS applications within its environment, Koehler said. The package requires a minimum of an IBM Personal Computer XT with 512K bytes of internal memory and 5M bytes of disk storage. A runtime version will be offered, but pricing was not available.

Various site licensing options also will be offered, including ones that let customers copy the package, Koehler said. He emphasized that customers must come up with an unambiguous definition of the site.

Early next year, MDBS also will deliver Guru for various personal computer local-area networks. Later in the year, a version for the Digital Equipment Corp. VAX-11/780 running under Ultrix will be offered. Micro Data did not release price information for these products.

Founded in 1979, Micro Data employs about 230 people and also sells data base management and integrated business software, including the Knowledgeman line.

■

AI tool suited for development

Micro Data Base Systems, Inc.'s Guru package proved well suited for creating small prototype expert systems, according to Brian Dearing, who manages systems programming for an IBM 3090 installation at a General Electric Co. site in Schenectady, N.Y.

As part of a course on artificial intelligence at Purdue University, Dearing and several dozen other GE managers "built prototype applications, using Guru software to do something related to our specialties," he said. Among the applications were systems designed to assist customers in selecting products, to help managers order parts and to plan salaries, he said.

Dearing decided to develop a program that aided in configuring IBM system software products for data communications and ended up with a system including "something on the order of 40 rules," he said. "It's conceptually similar to [Digital Equipment Corp.'s] XCON but obviously much smaller."

The prototype's results "are virtually identical to what the human expert came up with," Dearing said. He cautioned, however, that the problem had been circumscribed to cover only nine software products.

"One concern that I have is size," he said. Running on a micro, Guru may be effectively limited to systems with roughly 400 rules and may prove unable to "do anything really comprehensive," he speculated.

Dearing praised Guru as a development tool for solving problems that "are very intractable for a conventional MIS approach." The software allows authors to specify a problem "in exactly the way you would do it if you were writing it down," he said. "You don't have to cut any Lisp code." Guru can take "a two-step approach to the problem," reaching preliminary conclusions that a developer can modify while building the program, he added. "You can build a system incrementally, which made it much easier to work with a human expert."

"Guru tries to integrate itself with MDBS' Knowledgeman product, which is one of its strengths," he said. He described the software's performance as "surprisingly fast, with very little perceptible delay."

He also listed several minor criticisms, one centering on the problems of setting confidence levels. "It was difficult to specify confidence as a factor of anything — you end up writing multiple rules to specify that," he said.

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New 1-2-3 is designed to support the Intel 8087/80287 math coprocessors so users can perform many calculations faster. And it incorporates a wide range of added functionality from string functions and string arithmetic to easier range and error handling.

1-2-3 Release 2 has 40 advanced macro commands, so it's easier to develop customized applications from the simplest to the most complex.

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Lotus is offering a 1-2-3 Upgrade program to all registered users. For $150, registered users can purchase a special Upgrade product. Copies of 1-2-3 Release 1A purchased on or after April 24, 1985 can be upgraded for free.

Individual users can register by returning their 1-2-3 Warranty Registration Card to Lotus or by calling 1-800-TRADEUP.* Upgrade instructions will then be forwarded by Lotus.

Companies who want to order more than 100 copies of the upgrade product should contact their local Lotus sales office or call 617-253-9186.

For everyone who upgrades, there's also a $40 rebate offer on Intel's Above™ Board, the first expanded memory board certified by Lotus.

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*In Canada call 1-800-447-4700.

Suggested retail price of 1-2-3 Release 2 is $495. 1-2-3 Release 2 requires 256K RAM. Minimum requirement for 1-2-3 Release 1A is 192K.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

Pushing for a tape standard

Code-named Ocotillo, IBM's cartridge tape drive replacement for its popular 3420 reel-to-reel drive was eagerly awaited for five years before it debuted as the 3480 in the spring of 1984.

That 3480 was fairly well received by the mainframe customers who wanted to dump 10-in. reels of tape in favor of higher capacity, faster, sealed cartridges. With its announcement on March 22, 1984, IBM left open a wide area of growth for the 3480 technology — the many levels of smaller systems ranging from microcomputers to superminicomputers and non-IBM mainframes. IBM itself raised the question of how to fill that market by stating that the 3480 technology advancements "form the basis for IBM's direction in magnetic tape development."

Now a manufacturer is moving to address that market, and although it isn't IBM, the vendor apparently has IBM's blessing.

Cipher Data Products, Inc. is developing a 3480-type, cartridge-based tape drive for the small systems market and is kicking off a publicity tour this week to convince Cipher's OEM customers of the need for such a product.

But whether that product, due to be introduced next year, sells or even works isn't the primary question today. Of greater interest is Cipher's concurrent effort to encourage standardization of tape technology, a standard that Cipher, naturally, hopes will be based on its and IBM's 3480-type cartridge.

"It's basically an effort to stabilize the market," said Cipher Vice-President Larry D. Hemmerich of the five-city tour in which the company will outline a product strategy for the 1990s and discuss the need to standardize the ½-in. tape market around the 5¼-in. 3480-type cartridge.

Cipher has an agreement with IBM under which Cipher can use IBM's 3480 technology. What the San Diego-based

See **PUSHING** on page 56

Alliant's FX1 receives high marks from MIT researchers

By Donna Raimondi

CAMBRIDGE, Mass. — A computer the size of a large suitcase is creating a stir in an MIT laboratory.

The geophysics research group directed by Prof. Thomas Jordan has discovered that a modeling program took seven days to run on its Apollo Computer, Inc. DN460, which roughly approximates the power of a Digital Equipment Corp. VAX-11/750. That same program runs seven times faster on the lab's new Alliant Computer Co. FX1 processor, according to David Krowitz, system manager for the research group. He added that those figures came from subsets of the data that ran on the Alliant without that data being optimized first, so in reality, the performance could be better.

> *'It is not a workstation, not a microprocessor-based system and not a mainframe.'*
> — **Thomas Jordan, MIT**

The tests were run on an Alliant FX1 with one computational element board on it. The computational element board runs on the back end of the Alliant. It has a Motorola, Inc. 68000 instruction set, on top of which is an Institute of Electrical and Electronics Engineers, Inc. instruction set on top of which is a vector instruction set, Krowitz said.

The system's vector unit, for applications like the lab's problems that have code that is able to be vectored, will hit a peak rate of about 11 million operations per second, which is twice that of a VAX 8600.

Jordan said that it is beyond his ability to identify the type of system based on classic specifications. "It is not a workstation, not a microprocessor-based system and not a mainframe," he said.

Whetstone benchmark tests that the lab ran on a VAX-11/780 and on the FX1 showed the Alliant system ran four times faster than the VAX-11/780. With matrix

See **FX1** on page 56

Factory of future depends on past

Human, technological integration key

By Hal Mather
Special to CW‡

Manufacturing systems will change more in the next 10 years than they have in the past 50. These changes will be technology driven: computer-integrated manufacturing (CIM), artificial intelligence and mathematically optimized scheduling routines are among the many technologies on the horizon.

If manufacturing firms are to return U.S. manufacturing to its past level of preeminence, past performance dictates that they must learn from past mistakes — to date there have been more manufacturing failures than successes. As an example, few companies are enjoying the benefits touted by manufacturing resource planning (MRP II) systems although many have invested heavily in the concept.

To avoid failures when implementing today's new technologies, management must promote coordination between the various internal specialty groups within an organization. As it is now, manufacturing companies are broken down into functional groups. This allows specialists to concentrate on one aspect of the business, for example, sales, accounting, engineering or manufacturing. Within each of these functional specialties, subgroups of specialties are found, for example, marketing, advertising, industrial engineering, production and inventory control and so on.

This functional specialization is beneficial in the sense that expert attention is focused at key segments of the organization at all times. It is detrimental in that no one person, other than the general manager

See **FACTORY** on page 60

Mather is president of Hal Mather, Inc. of Atlanta, an international management consulting and education company.

INSIDE

Falco Data Products announces its first nonemulating terminal and is reworking its distribution plans/**54**

Bull Peripherals unveils its first large-system printer to the U.S. end-user mart/**54**

NEW THIS WEEK

- Tallgrass introduces its Flextor series of hard disks
- Ampex shows DEC-compatible monitors

For more on these and other new products, see pp. 111-136.

INSTANT ANALYSIS

'The IBM 3270 market is so big that nobody could be too late getting into it.'
— **John King, consultant, on AT&T's debut of a 3274-compatible controller.**

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* Based on room inventory of Hilton Hotel Corp., which does business in the U.S.A. Source: New York Times article, week of 4/1/85

Falco announces nonemulation terminal

By James Connolly

SUNNYVALE, Calif. — In a shift from its earlier product design and sales strategy, Falco Data Products, Inc. has announced its first nonemulation terminal, which will be sold through distributors as well as the firm's established OEM customers.

The Falco 500, scheduled to be displayed at Comdex/Fall '85 this week and available next week, eventually will replace much of the existing Falco line of emulation terminals. The company said the Falco 500 was designed to address the entire ASCII marketplace and to allow support for products such as local-area networks and multicommunications port devices.

"Our earlier products were designed to be modified by OEMs. The Falco 500 can't be modified except for some software changes. It was designed to go out as a single product," said Falco President and Chief Executive Officer Edward Browder. "Our role has changed. No longer can we be content to simply emulate existing products. We have reassessed the marketplace and our design philosophy while taking into account the changing technological environment of our customers. Our extensive research of the communications and terminals marketplaces has allowed us to introduce a product that has the power and flexibility to accommodate existing requirements and requirements into the future," Browder added.

The Falco 500 is said to feature a multihost windowing capability allowing users to display data from six hosts with six protocols. It also features a flat-profile CRT with soft white, standard green or amber displays, a 10- by 16-pixel letter-quality character and 64K bytes of random-access memory.

The Falco 500 reportedly is compatible with ANSI X3.64 protocols, terminals such as the Digital Equipment Corp. VT220, VT100 and VT52 and terminals from Televideo Systems, Inc., Wyse Technology, Inc. and Applied Digital Data Systems, Inc.

The Falco 500 costs $795.

Bull unit shifts sales approach

By James Connolly

SUNNYVALE, Calif. — Bull Peripherals Corp., a subsidiary of Groupe Bull of France, has shifted its U.S. marketing approach from strict OEM sales to a combination of OEM sales and sales under its own name.

The first product to be distributed in the U.S. and Canada under the Bull Peripherals label is Bull's MP 6090 nonimpact magnetic page printer.

Bull Peripherals announced recently that the MP 6090 will be distributed and serviced by Technet, Inc. of Dallas, an association of 13 independent regional distributors, under a $10 million agreement extending through 1986 with an option for renewal through 1989.

The MP 6090 was designed to handle high-volume printing in data processing environments, printing 90 page/min, the equivalent of 6,000 line/min on continuous form paper. Bull Peripherals officials said the MP 6090 is intended to provide better reliability than laser printers and more speed than impact printers, which print 600 to 3,000 line/min.

"This agreement will allow us to sell our magnetic printer directly to the end user, supplementing our current OEM sales activity.

"The MP 6090 fills a need in the data processing market for a printer designed for both high-duty cycle printing and high reliability. The agreement with Technet will help us to penetrate this market," according to Farid Neema, president of Bull Peripherals.

The OEM price for the MP 6090 is $55,000 in single quantity.

Camax unwraps Unix-based CAD/CAM tools

Camax Systems, Inc. of Minneapolis has introduced a line of mechanical computer-aided design and manufacturing software and systems based on AT&T Unix.

The Camand products were designed for applications in mechanical manufacturing engineering, tooling and complex machining with an emphasis on plastics molding, the vendor said.

According to Camax, the systems are available on a variety of workstations with prices beginning at $30,000.

Camax said the products run on most 32-bit superminicomputers and workstations, such as the Data General Corp. DS/4200 and Silicon Graphics, Inc. Iris 2400, and minis and personal computers such as the IBM Personal Computer AT.

The Camand package consists of a three-dimensional modeler, a design documentation module for drafting and bill of materials generation and a multiaxis numerical control programming module for automated numerical control programming of 2½-axis through 5-axis milling machines, according to the vendor.

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But it's more than just a protocol converter or a peripheral controller. It's the powerful nucleus of a system designed to link mainframes, as well as minicomputers, to any ASCII terminal or PC, whatever its make or location. It even provides up to 64 multiple host sessions concurrently.

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FX1 receives high marks

From page 53

arithmetic functions, including additions and multiplications, the FX1 ran 10 to 20 times faster than the VAX-11/780, Krowitz said.

With a vector processor, Krowitz said, the FX1 system runs at twice the speed of the VAX 8600. Where the 8600 price is in excess of $350,000, the Alliant costs about $160,000, he said.

The MIT lab is one of the first users of the Alliant FX1 machine. The FX1, with one interactive processor, 8M bytes of memory and 67M bytes of storage, arrived at 5 p.m. delivery day, was plugged into the wall outlet and was running an hour later, he said.

The lab is planning to hook up its Apollo Computer, Inc. Domain network of six Apollo workstations to the Alliant via Ethernet interfaces, Jordan said. After some initial problems in getting Apollo's and Alliant's Ethernet software packages to communicate, the system is working well.

"When it takes seven days to run [a program], you don't do many models," Krowitz said of the programs that make a model of the Earth, calculate the ways it might vibrate and compare the data against actual earthquake data.

Because it only takes a day to do the same kind of model it took seven days to do before, the lab is investigating running more kinds of models. The staff is even considering running a proposed modeling effort it had not attempted before because it would take 14 weeks on a VAX-11/780, Krowitz said. The Alliant will bring the time down to two weeks.

One research project within the lab ran a test program on the DN 460 and then on the Alliant. On the Apollo machine, the test ran in 60,000 CPU seconds, according to Krowitz. On the Alliant, the same test ran in 3,000 seconds. Then Krowitz remembered that he had left out a compiler optimization switch, so the group ran the program again after optimizing it. The last test run took 2,300 seconds.

Part of that time savings is because of the processor, part of it because of the larger memory that the Alliant has — 8M bytes as opposed to 4M bytes on the Apollo — and part of it is because of the optimization of vector portions of a program run, Krowitz said. After running the tests and being pleased with the results, the same researcher doubled and then tripled the size of the test. At that point, "We ran out of disk space," Krowitz added.

As soon as the system was delivered, the staff wanted to do more projects. They soon had to decide on upgrades, and they have ordered an additional 167M-byte 8-in. Winchester disk drive, another interactive processor and an expansion cabinet. Between the time Alliant quoted MIT the $160,000 purchase price and delivery day, the company dropped its prices by $20,000, which allowed MIT to upgrade without running over its original price of $160,000.

Alliant is "pretty good" about support, Krowitz said. The company, which is located only a few miles away in Acton, Mass., is still fairly small. They have built diagnostic systems into each of the five kinds of processors found on the system, but so far the lab has not had any hardware-related problems.

Alliant can tie in remotely to the FX1 terminals to help iron out software bugs. The lab has come up with a few compiler bugs, Krowitz said, but nothing a user would not expect in a company's first product.

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NEW YORK GENEVA SYDNEY

Pushing for a tape standard

From page 53

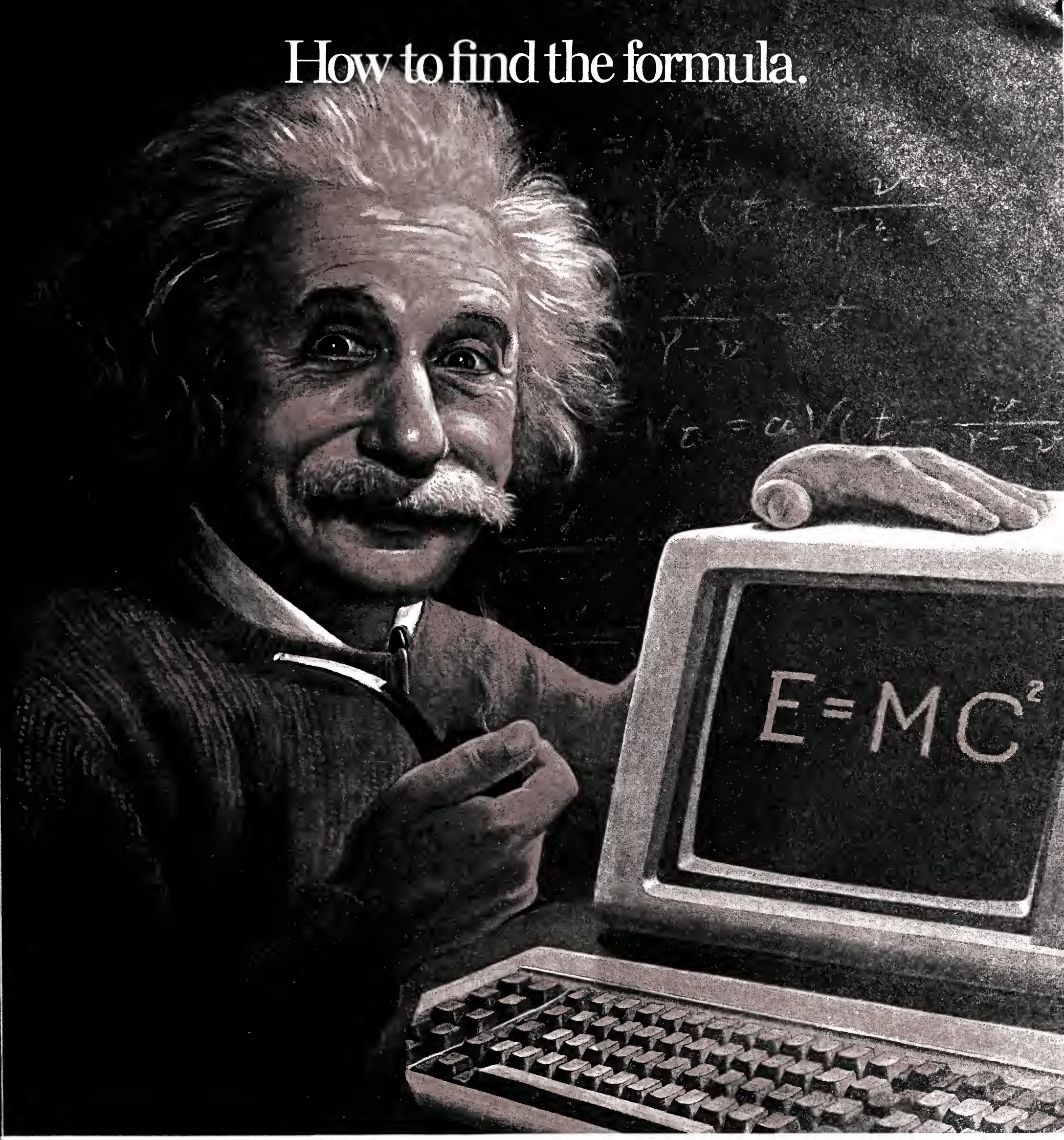
peripherals vendor plans to offer is a ½-in. tape cartridge to support supermicrocomputers in the class of Sun Microsystems, Inc. Sun workstations and the Digital Equipment Corp. Microvax II. Cipher said it hopes to develop similar cartridge drives for both smaller and larger systems at a later date.

Hemmerich reported that his company's first cartridge product will use the small computer system interface and will be compatible with Cipher's existing cassette drive that uses ¼-in. tape in small systems.

Although Hemmerich and his staff will be using their publicity tour to boost their own product, Cipher does have a point. The introduction of the 3480, a radically new product, at the high end of the market when there is no tape technology dominating the lower levels, provides an opportunity for standardization seldom seen in the computer industry.

Disregarding the question of whether the 3480 technology has already become the de facto standard for tape and whether Cipher or any other vendor can deliver small systems products using that technology, there is an argument to be made for setting some standard in the tape business.

Even if that standard isn't the 3480, vendors should strive for and users should demand standardization of at least one area in a business where new types and classes of computers are continually expected to communicate with other systems. Anyone who doubts that need should listen to users who deal with aspects of DP other than storage, people who have had the misfortune to attempt to network multiple vendors' microcomputers, minicomputers, superminis and mainframes.



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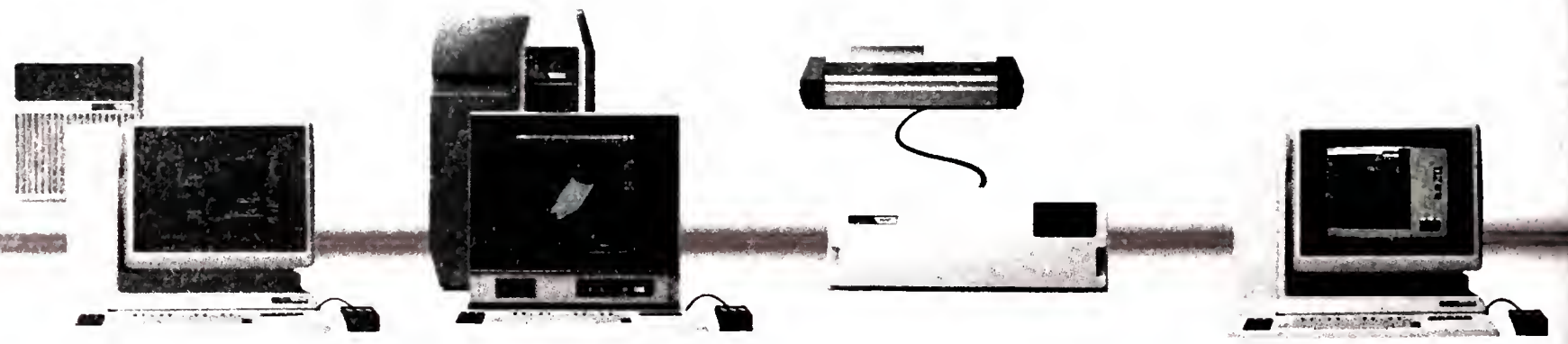

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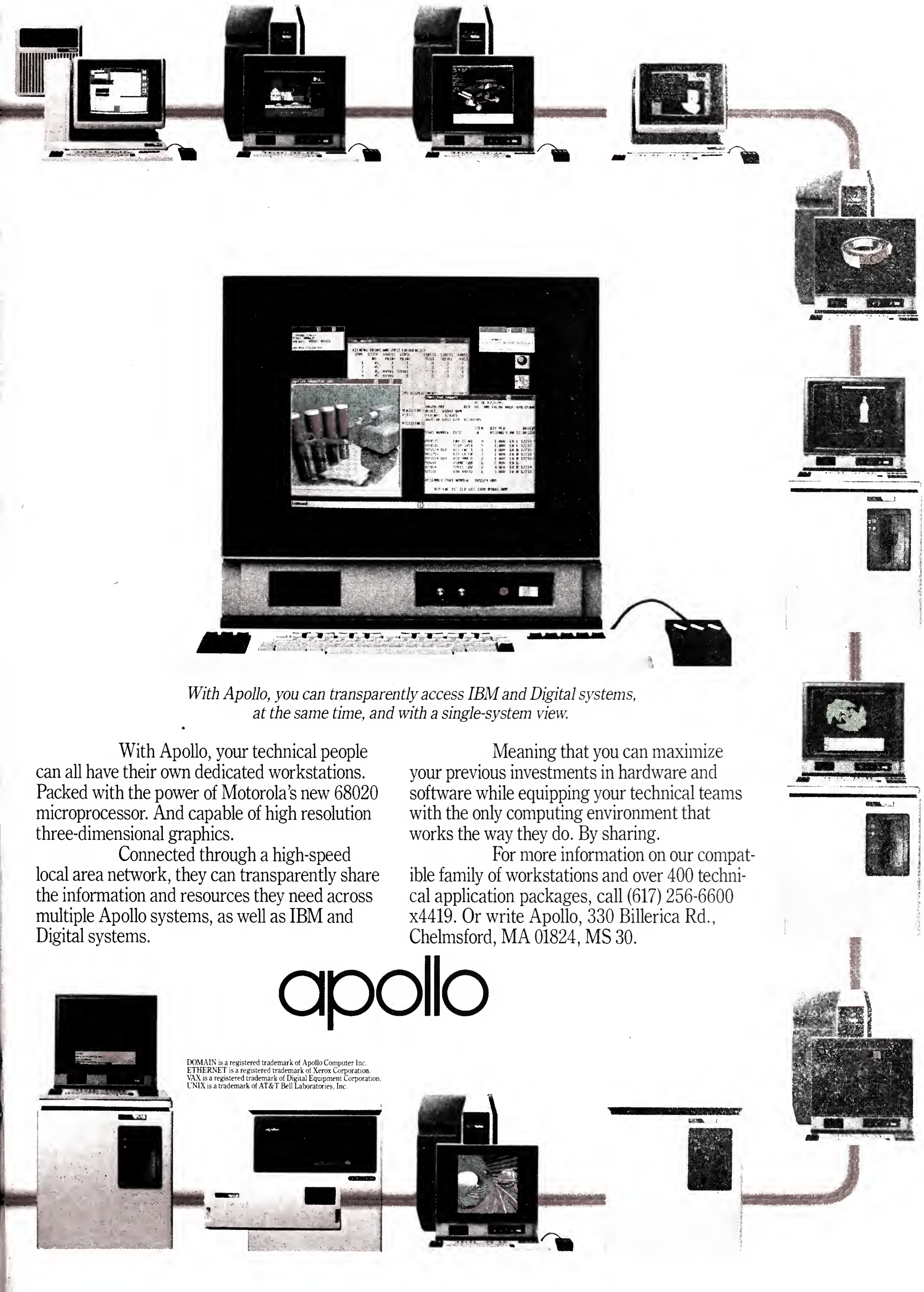

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Factory of future depends on past

From page 53

and possibly the MIS or DP manager, concerns himself with the coordination of all these isolated functions into a smooth-running whole.

The early attempts at implementing material requirements planning (MRP) show clearly the functional specialization problem. Implementations of MRP failed in many companies because MRP was treated as a production and inventory control technique.

Companies did not see the need for structured bills of materials from engineers, forecast data from sales and an operating business plan called a master schedule. But more important, management failed to elicit the help of the various business specialties in forging a comprehensive system for the business. Therefore, specialty groups did not contribute their expertise and local data for the benefit of all.

The few companies that successfully implemented MRP and progressed on to MRP II avoided these mistakes. They realized the need for coordination between functions and worked to get it. Senior management steering committees and multifunctional project teams were established, which forced specialists to broaden their horizons to the total business.

This broadened view of the business caused other changes in these companies. Organizations were modified, responsibilities and accountabilities were changed, and a team approach was fostered. These changes contributed as much, if not more, to the benefits than the new system.

Manufacturing firms face similar challenges with today's new technologies. Computer-aided design and manufacturing, robotics, computer-aided process planning (CAPP) and CIM are new technologies that are part of the factory of the future. But frequently, these technologies are being developed in isolation without regard for the plant as a whole.

The factory of the future will receive a customer's order, design the product on a CAD system, develop the best routings based on current machine work loads and available capacities on a CAM system, direct the procurement of needed raw materials, instruct the various machines and processes how to produce the product and guide the automated materials handling and storage equipment to move the product through the plant to the shipping dock.

Data will be entered once into the system at order entry time; all other data will be created as needed and will move electronically between these various subsystems.

As companies move toward this process, it becomes necessary for data to shed its parochial image. Data must be accessible to all. It is also obvious that organizational distinctions between functions will blur.

Realizing true data integration will not come easily. Companies will face many hurdles along this path. The current use of personal computers, where users control isolated segments of data, will give way to an integrated data approach. Local-area nets and better data standards will provide this capability. Integrated networks moving data between subsystems as needed will be the norm.

The push for data integration will come from advancing technology,

> *The key to the factory of the future is MIS or DP managers. They alone have an overall company view; they are not bogged down in functional specialties.*

and it will revolutionize manufacturing, just as farm machinery revolutionized agriculture.

Artificial intelligence, now in its infancy, will have a huge market in manufacturing. It is obvious that today's simplistic, and to some degree, illogical, planning and control systems will not be able to run the factory of the future.

Companies with foresight will view data as a corporate asset, to be used for the benefit of the total business. They will manage this resource, just like any other company resource.

The key to the factory of the future is MIS or DP managers. They alone have an overall company view; they alone are not bogged down in functional specialties. It will not be necessary for these managers to take a project leadership role in the factory of the future — far from it. Companies should have operating managers in charge to decide how best to run the business.

The MIS or DP manager's role will be to encourage a coordinated business team approach to manufacturing and to guard against separate functional systems. The MIS or DP manager must work with top management to assure that data is used and safeguarded as a business resource.

Companies have failed before with this task. Manufacturers cannot afford to fail again — our country's economic well-being is too important for any more false starts.

Unless companies learn from the past, they will fail to have factories of the future — and they will leave a legacy of many factories without a future.

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- **Optimization of the generated code.** We know the 370 instruction set and the various 370 operating environments. We have over 100 staff years of assembler language systems experience on our development team.
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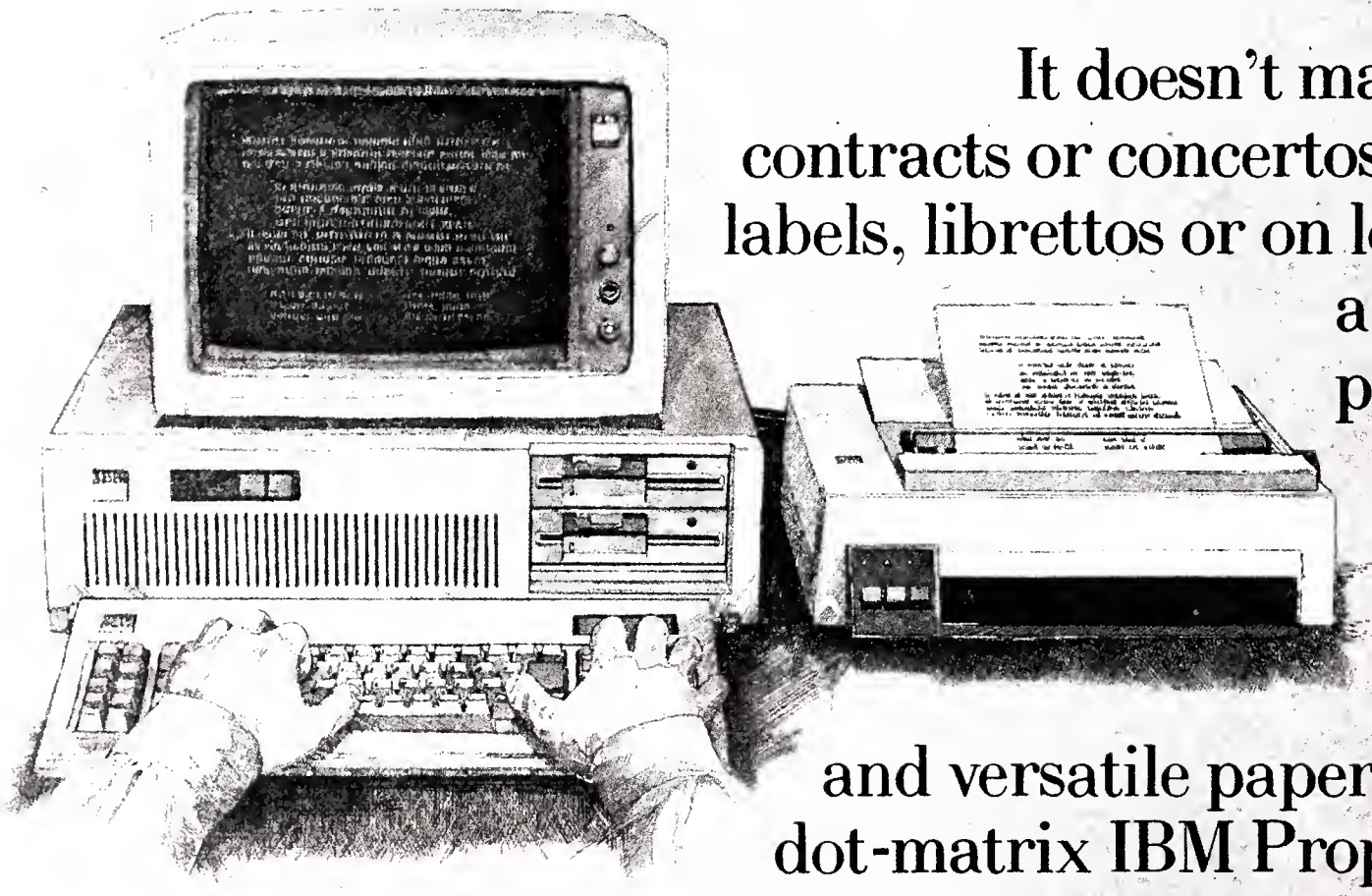

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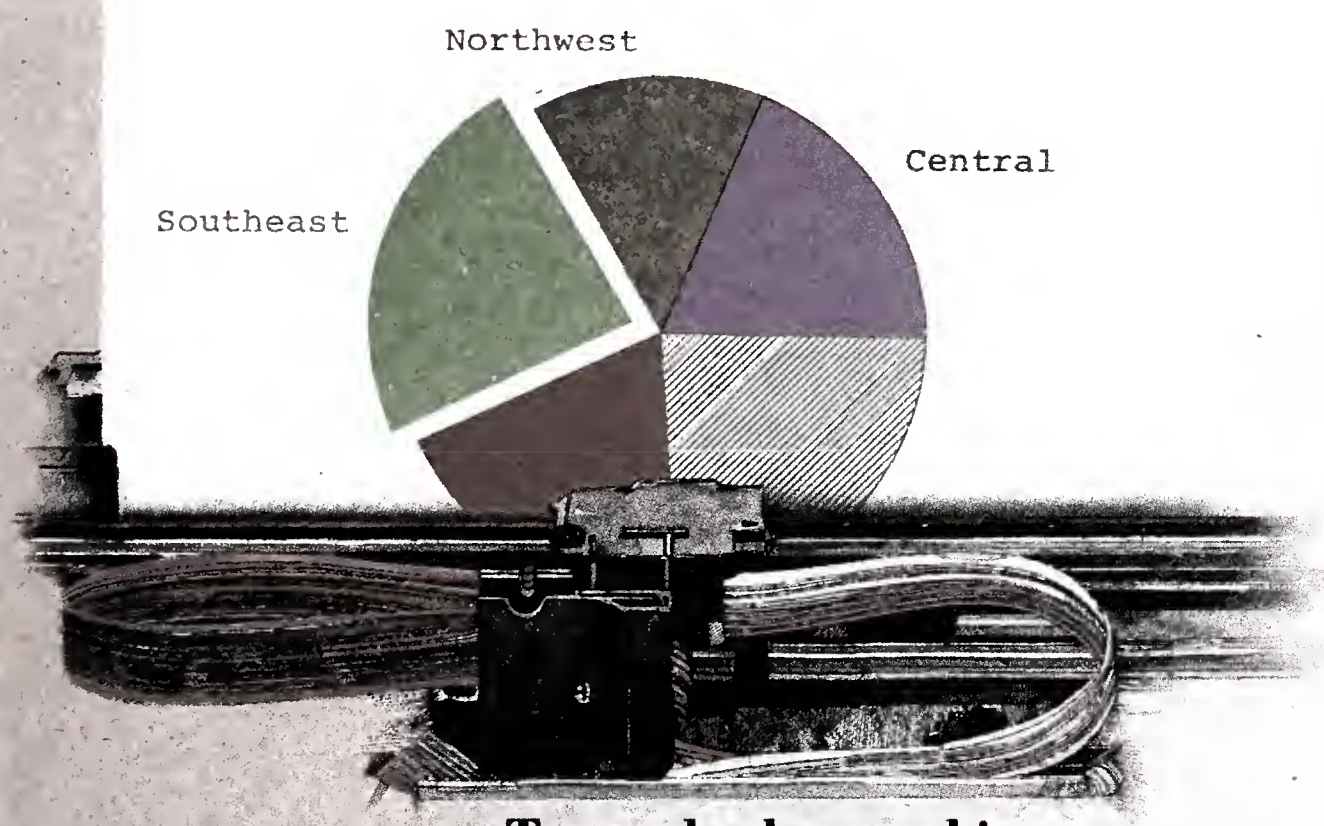

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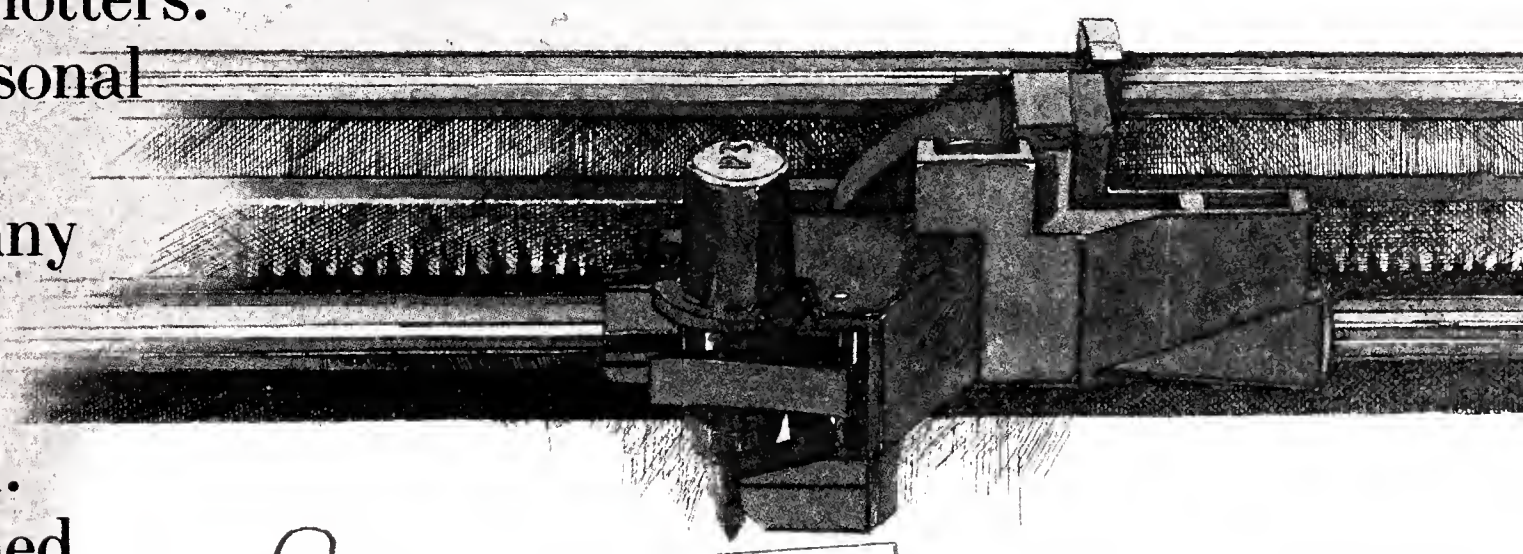

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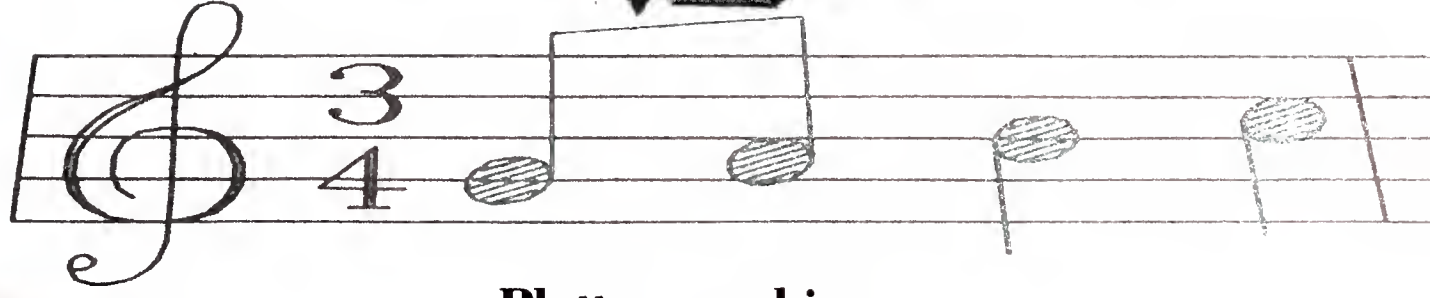

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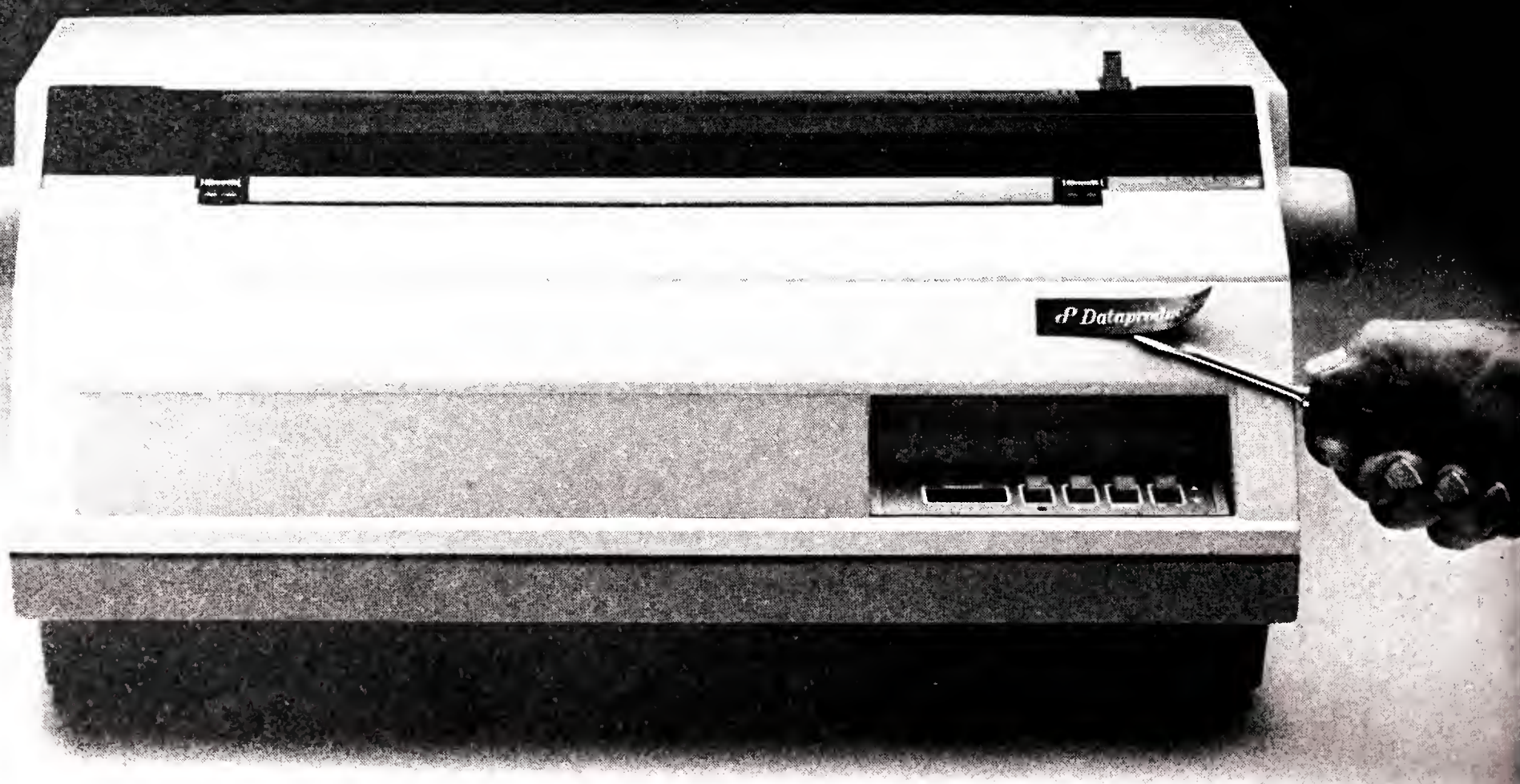

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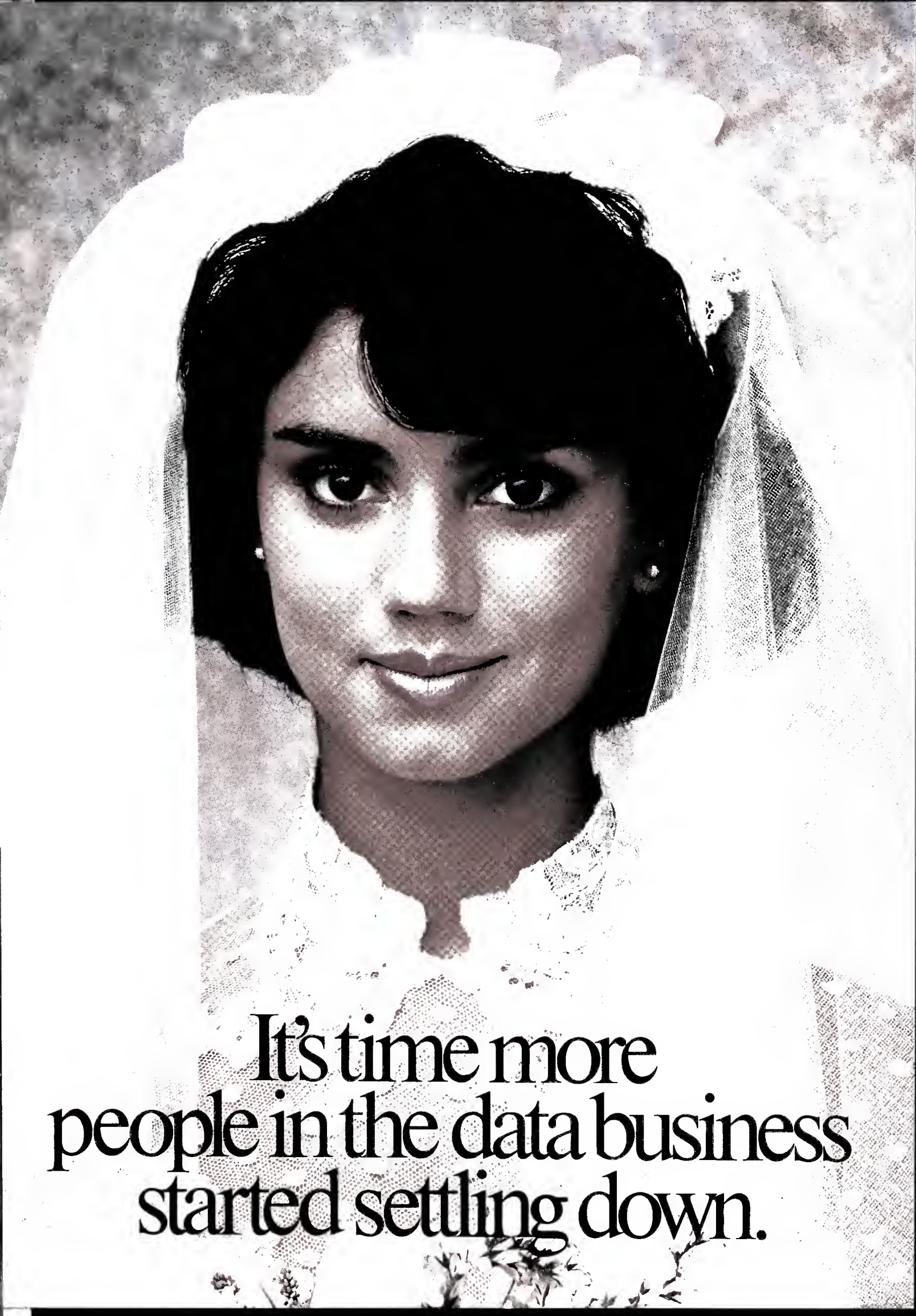

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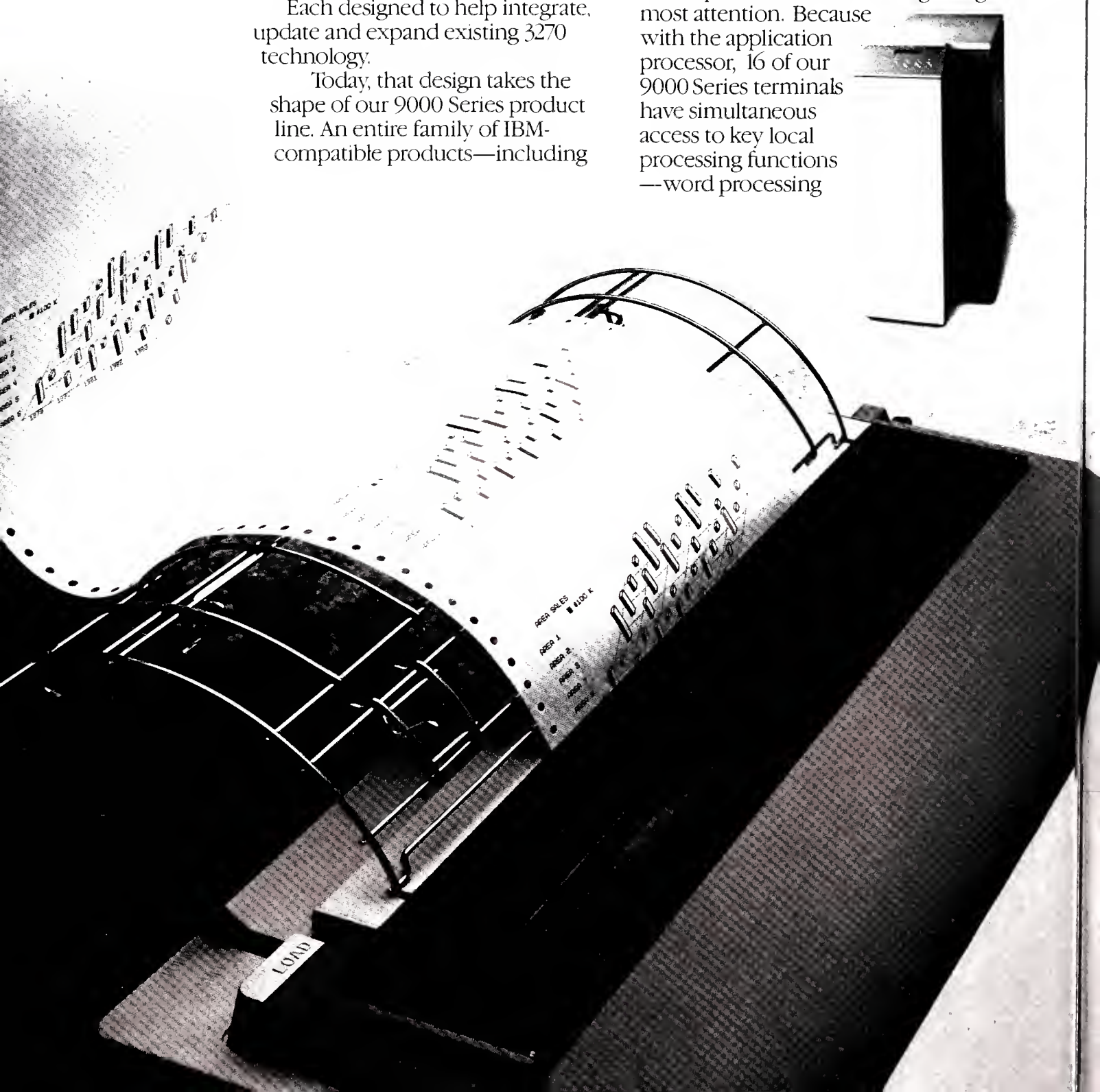

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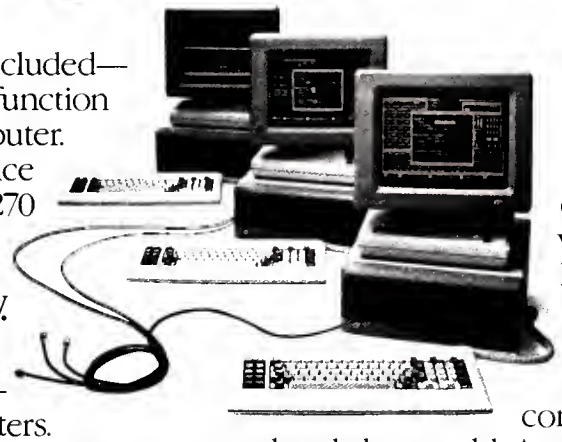

The rest of the family.

Directly related to the AP are the 9000 Series controllers, terminals and printers.

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All of which means that with the 9000 Series product line, you'll have the first fully IBM-compatible *system* on the market today.

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The 3Com EtherSeries is five times faster than most other LAN offerings and provides easy networking in the critical areas of information, resource sharing and communications. The 3Com EtherSeries is, quite simply, the best LAN in the industry.

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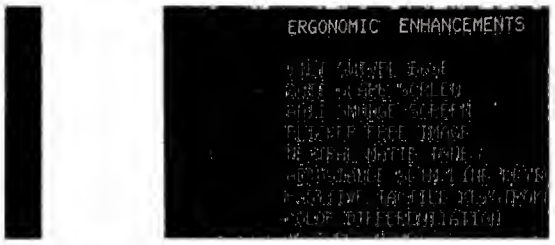

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IN DEPTH

Universal networking —it's a mirage

What the world needs now, some argue, is a worldwide digital network to integrate the glut of long-haul telecommunications services. But the era of universal networks remains wishful thinking as long as communications firms and value-added network vendors keep playing on different teams.

By Daniel Miller

The proliferation of personal computers, communicating word processors, VDTs and other types of electronic terminals in offices and homes has been turning the telecommunications industry on its ear for several years. More digital devices hanging off long-haul networks are bound to bring more revenues to the makers of digital switches, local-area networks and other communications hardware and software.

What the world needs now, some argue, is a single, robust, end-to-end digital network to hook all of these things together — an integrated services digital network (ISDN).

Daniel Miller is president of Opus Research, Inc. a San Francisco consulting firm specializing in communications issues. He has done strategic planning for Link Resources, Inc., Pacific Telesis Group and Warner Communications, Inc.

IBM's announcement of a joint networking venture with Nippon Telephone and Telegraph Corp. (NTT) in late September highlighted the international scope of ISDN development. The prime candidates for providing such services, value-added network service providers, now sell about $585 million worth of service annually in the U.S. With help from international connections, these providers expect revenues to increase at least tenfold over the next five years.

Common wisdom holds that given a telecommunications network with enough bandwidth and functionality — smart nodes on an electronic data superhighway — a universal information network is a certainty. In fact, AT&T dubbed this the era of the "Universal Information Services."

Earlier this year, AT&T began promoting this concept in an aggressive advertising campaign, listing four major benefits:

■ Integrated voice, data and image transport. AT&T asserts that "what telephone companies want is a single network transport architecture that can handle voice, data and image interchangeably and simultaneously."

■ Services instantly adaptive to customer demands. Vendors should provide "a fast, flexible way for businessmen to get exactly the services they want when they want them and ultimately pay for only what they use."

■ Universal access through universal ports. The concept involves locally hooking up intelligent devices in the office.

■ Graceful evolution of current networks. Characterizing all competing network services as "quick-fix" solutions, AT&T sees its network services evolving to serve customer needs over the long term.

Not too practical

All of these claims reflect a level of optimism worthy of the theory that an infinite number of monkeys with an infinite number of typewriters have a good chance of writing the "Gettysburg Address." The goal is valid but the methods unlikely.

A universal network is the Information Age's answer to the Tower of Babel. Building it will require participation from firms that typically do not cooperate or work together closely. The firms belong to several different but related industries.

■ Network operation and information transport.

■ Computer, switch-gear and peripheral manufacturing.

■ Software and electronic service provision.

Standardizing implementations

Picture this: A plenary meeting among these industries' representatives whose agenda consists of developing specifications for network architecture as well as capabilities, interfaces and other attributes. Standardizing all these implementations will be a dream-turned-nightmare. And that's just the beginning.

After separating "must have" from "nice to have" features, future service providers will have to select equipment vendors, develop system and applications software and only then begin construction and promotion campaigns.

> *The greatest irony of the communications status quo is that the dominant communications firms regard value-added networks as competitors rather than allies.*

While all this is going on, potential customers — particularly large corporations — have been identifying their own very specific needs and developing their own solutions. They have gone shopping for solutions among the growing ranks of value-added networks.

Domestically, the list of value-added network vendors already includes AT&T, GTE Telenet Communications Corp., Tymshare, Inc., ITT Dialcom, Inc., United Telecommunications, Inc. and Compuserve, Inc. as well as special services provided by IBM, Western Union Corp., ADP, MCI Communications Corp. and several other long-haul carriers. Taking into account terrestrial cable and microwave, fiber-optic networks and satellite transponders, there is a growing glut of bandwidth for long-haul telecommunications.

These vendors collectively fuel the development of many different, incompatible product lines, making the task of standardization that much harder.

Changing the division of labor

There is a group of firms that provide the building blocks or raw material for the systems of today and tomorrow. Like the providers of steel to the auto industry, "pure" computer companies (such as Data General Corp., Perkin-Elmer Corp. and the like) and "pure" carriers (such as MCI, Western Union and some of the small, independent telephone companies) sell commodities.

The types of companies that must provide the raw material for the computer and communication revolution are the following:

Network providers. These companies really are in the transportation business. They are the telephone companies, long-haul carriers, satellite system operators and, tangentially, CATV operators that own physical plants for delivery of communications from a point of origin to its destination for a fee.

Equipment manufacturers. These marketers offer private branch exchanges (PBX), switches, computers and terminals. Their challenge is to coordinate simultaneous development of hardware and software to fulfill expressed needs of existing and potential customers.

The other side of the coin involves these companies' support for work done on their behalf by other companies or individuals. In the jargon-rich world of communications, these third parties are most often referred to as "value-added (fill-in-the-blank)s." The top computer manufacturers rely on value-added resellers to make their products attractive to specific customer groups. Value-added networks refers to everything from cheap long-distance carriers to integrated service networks carrying voice, video and data.

The greatest irony of the communications status quo is that the dominant communications firms regard value-added nets as competitors rather than allies forging new markets in computers and communications. Previously regulated telephone companies have been given a green light to enter competitive markets and seem pleased to be out of the commodity business. Apparently, they would rather take credit for the shiny sports car coming off the assembly line than for the steel that went into the chassis.

The international arena

There is a scene in a Preston Sturges movie where the hero, played by Dick Powell, has put in a very long day at the office. On this particular night, when the door to the elevator opens, a black cat strolls out in front of him. Playing the fool as only he can, Dick Powell asks the night watchman, "Jimmy, does a black cat crossing your path bring good luck or bad luck?"

Jimmy responds, "Well . . . that all depends what happens afterwards."

The door of the elevator to Universal Information Services has opened and, lo and behold, IBM is already standing there along with AT&T and its Japanese counterpart, NTT. Whether their presence is good or bad for universal networking all depends on what happens next.

The first step toward U.S. participation in Japanese telecommunications came on April Fool's Day

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You can't imagine how much easier this Typing Station is going to make my life at work.
Now I can make all those little changes on your standard documents without retyping every one from the start. It can even check my spelling when I'm done. What a relief that is.
I guess it just goes to show: The best secretaries deserve the best.
Thanks.
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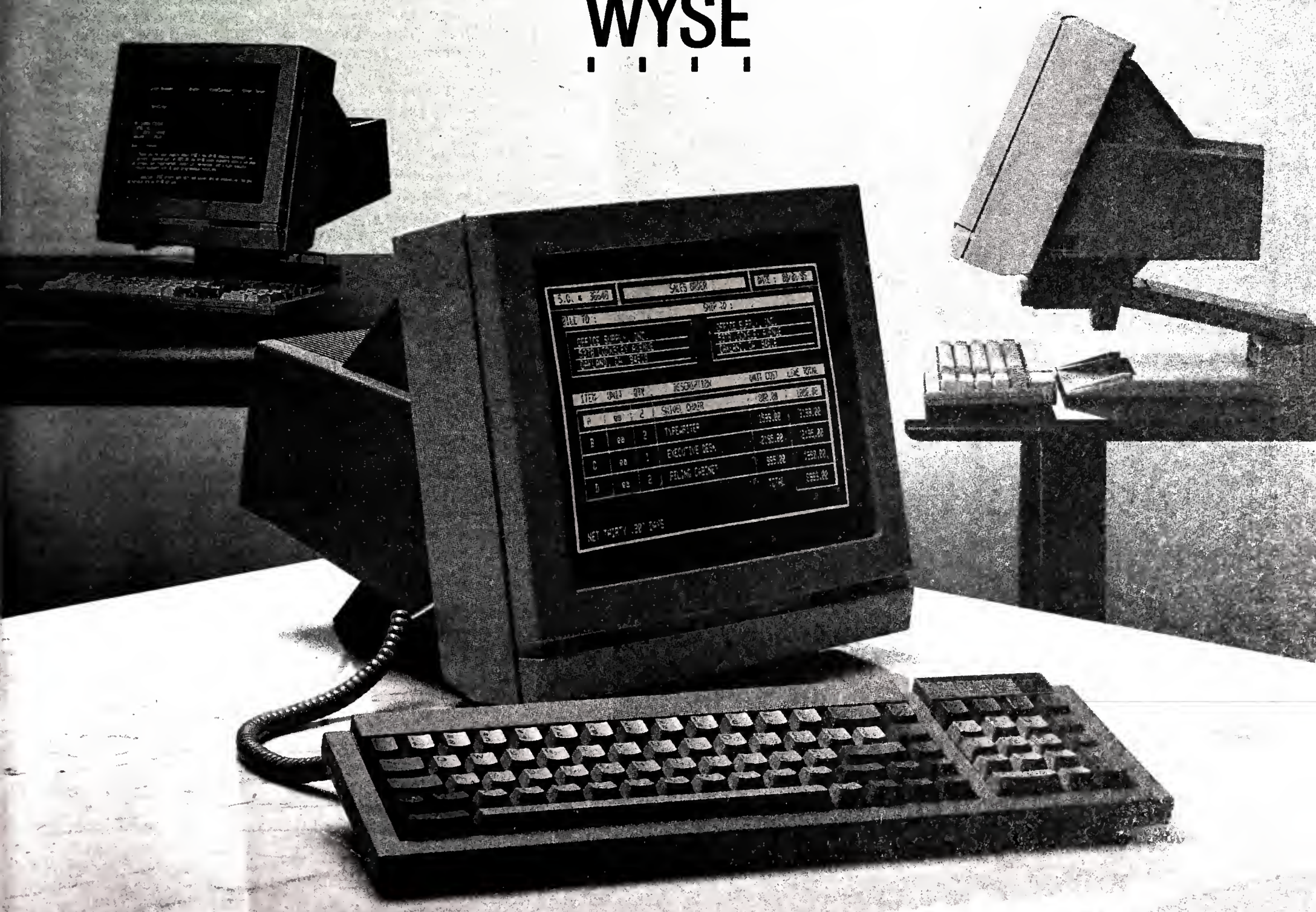

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1985, when laws liberalizing the Japanese telecommunications market went into effect. Three months later, AT&T announced a new value-added network venture in Japan.

A top marketing executive explains, "AT&T believes that, as we move in the future, we will need a worldwide, enhanced network to supply customers needs. This [value-added network] is the beginning of what we hope are many networks that will be tied together."

In all, 18 Japanese companies are involved in the joint venture with AT&T, including the Industrial Bank of Japan, Mitsui and Co. (a huge trading company), Nippon Steel Corp., Nippon Life Insurance Co., Kokusai Denshin Denwa Co. (KDD — Japan's Western Union), Sony Corp., Fujitsu Ltd. and Hitachi Ltd.

It wasn't until late September that IBM and NTT announced their joint venture. The joint firm's first project represents something of a baby step. Roughly $3 million is allocated to providing integrated data communications services in Japan via a combination of the two companies' resources. NTT's domestic value-added network will get to carry IBM's Information Network Services (INS) to IBM computers, terminals and compatibles nationwide.

The quid pro quo for IBM lies in an agreement with the Japanese ministry of international trade and industry, allowing IBM to buy patents and technology developed by Japanese companies. The patents are actually owned by the Japanese government. New products based on these developments are sure to be introduced to the North American market soon.

Just as in the automobile industry, Japan may emerge as the spawning ground and beta test site for products for which the largest market is in North America. There is bound to be an information services equivalent to the Dodge Colt — Japanese-manufactured with a private American label. Both AT&T and IBM would have no qualms about marketing products that are the fruit of joint ventures with their respective Japanese partners.

Both must also beware of biting off more than they can chew. A "universal" solution consisting of an integrated service data network and universal smart nodes provided by a single company may work in the relatively small Japanese market. Common sense and economic realities show that would be prohibitively expensive in North America.

What happened to Mitel?

Telecommunications joint ventures with international scope are not new to IBM. Prior to its marriage with Rolm Corp., IBM had quite a romance going with Canadian-based Mitel Corp. The product of that joint effort was to be a third-generation programmable PBX produced by Mitel with technical assistance from IBM.

Rave reviews of Mitel's SX-100 and SX-200 lines of digital PBXs for small businesses persuaded Mitel that its next area for growth lay in marketing larger switches to larger companies. It set out to develop a much larger SX-2000, offering more features ("functionality" in popular switch-talk) to more telephones.

When Mitel announced the pending introduction of the SX-2000, industry experts viewed it as an attempt to leapfrog industry leaders such as Northern Telecom, Inc. by being the first to introduce a third-generation PBX.

Apparently, the most distinguishing feature of third-generation PBXs is that they will carry voice and data at the same time, but there is much more. The switch is designed to be the heart of a very sophisticated communications network that, in essence, keeps track of the character, needs, preferences and desires of all the instruments that are hooked up to it, including IBM Personal Computers and bi-synchronous terminals.

For the SX-2000, Mitel has added many more features to those made popular by the SX-200. The housekeeping work that the switch has to do has expanded geometrically. A larger number of a wider variety of instruments (including computers, synchronous terminals and integrated voice/data terminals) performing more functions require the central switch to do more and more polling, file storage and record-keeping in addition to just putting the calls through.

The core of the SX-2000 is

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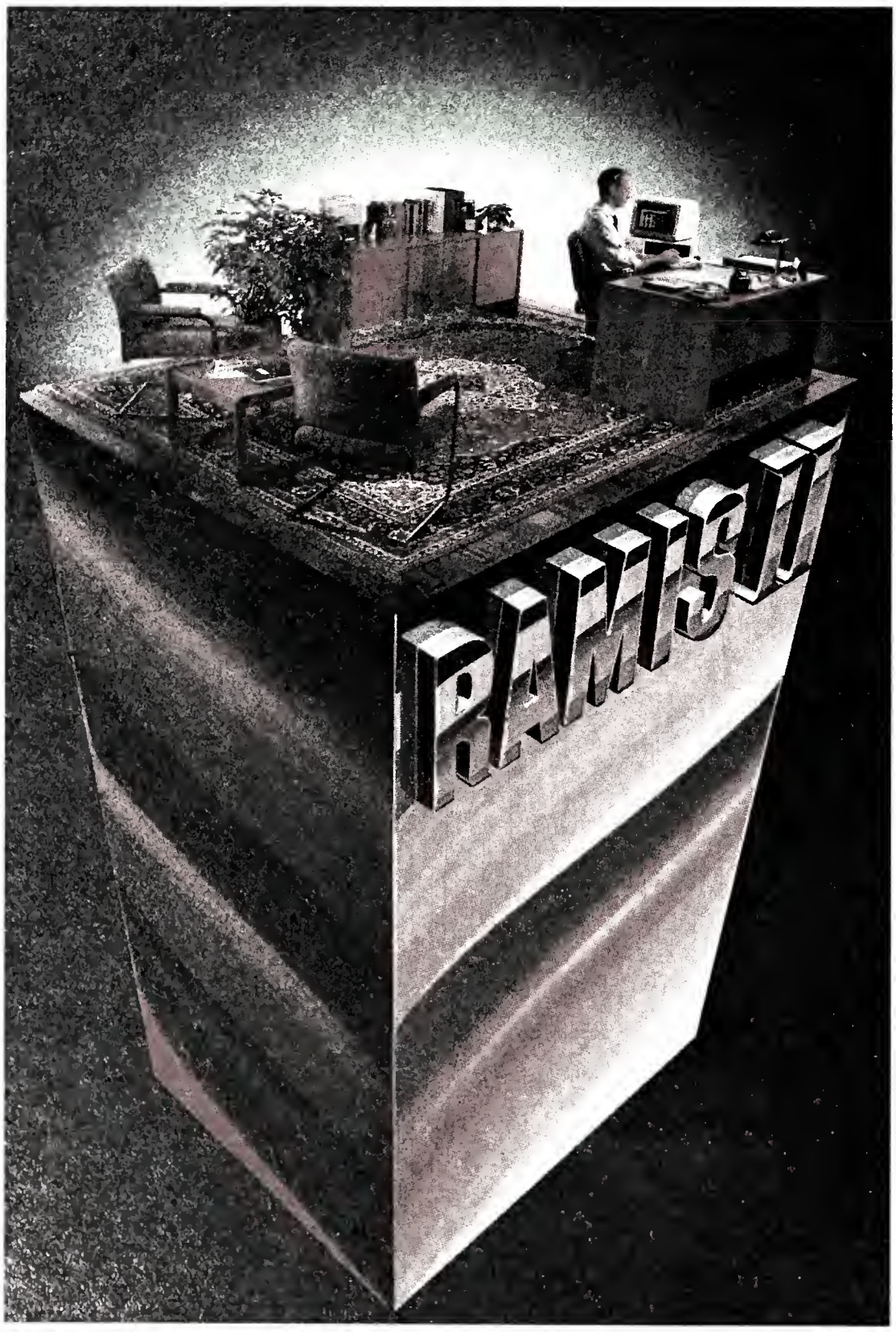

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It took 10,000 miles of wiring and some heavy construction beneath the Chicago River, but the end result is a fast, efficient flow of information between seventy-five floors of offices in eleven different buildings. Speaking of fast and efficient, the entire system was designed, installed and fully operational in just nine months.

The system is built around two AT&T System 85's to provide both voice and selected data communications, and a uniform wiring scheme that allows for as much future expansion as the buildings will bear. It also helps First Chicago control their communications, allowing the different departments to work together more effectively as one business.

This translates into better customer service, improved margins, and a reduction of selling costs.

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AT&T

The right choice.

a powerful superminicomputer capable of processing a few million instructions per second (MIPS). However, the switch was burdened with so much computing overhead that it was tough to get it to process more than two telephone calls per second.

What implications does this level of performance hold for a nationwide network? If attempting to be the universal solution for a limited number of terminals in an office setting could do this to a multiple-MIPS machine, what will happen in the attempt to offer universal access through universal ports? Switches will need to process 2 billion instructions per second to do all that housekeeping.

One of the oldest saws from Marketing 101 comes from Professor Theodore Levitt's *Harvard Business Review* article entitled "Marketing Myopia," in which he attributes the demise of passenger railroads to the companies' failure to realize in what business they are.

Good old competition

Railroad executives, he says, remained concerned solely with operating a railroad when they should have realized that they were in the transportation business. Because they were myopic, they did not see themselves in the same business as the passenger airlines and eventually gave up the lion's share of their long-haul customers to the faster, less expensive means of transportation.

Firms in the "communications" business suffer from the opposite problem. In 1985, the telecommunications industry encompasses such a wide variety of enterprises that the term is meaningless in both a semantic and a strategic sense. Hallmark Cards, Inc. now considers itself in direct competition with AT&T in the communications business. It sells "communications" purchased in stores and transported and delivered by private common carriers (dressed in blue hats and grey sweaters).

AT&T's "Universal Information Services" monicker, too, is fuzzy. The term is broad enough to mean AT&T supports the development of, while not actually providing, end-to-end universal service.

However, it could also mean that the phone company is driving its own standard — unilaterally developing its universal, end-to-end service without regard for numerous North American companies with whom the company needs to play ball. It must be hard to have to say, "If you don't play my way, I'll take my ball and leave," when you used to own the whole ballpark.

The Federal Communications Commission's Nov. 1 announcement may strengthen AT&T's individual position even further. After lifting restrictions that required AT&T to maintain a separate subsidiary for marketing end-user equipment, the FCC approved two business phone services that will go far to make AT&T the single source of low-cost communications services to large businesses. The first, called Megacom, is a lower rate direct connect service for high-volume users.

Of greater interest to data communications users is the approval of Software Defined Network service, which gives large businesses the opportunity to pay for only the data carriage capacity used rather than leasing a line on a monthly basis, leaving the line always open.

These pay-as-you-go services represent two significant steps toward AT&T's umbrella concept of Universal Information Services. However, there is still a long way to go.

In the U.S., AT&T has been promoting mainstream telephone service for more than 100 years. But in Japan, AT&T is playing with an expansion club, taking sides with a group of upstarts that are making a run at NTT. At the same time, IBM is showing that it can provide network services using the physical plant operated by the historically dominant common carrier.

To stretch the baseball metaphor further, Japan serves as the farm system, producing ball players (in the form of products and alliances) for both pennant contenders. The farm team is turning out some good players, and we'll have to wait until another, future season to see which team can take the World Series. The result will be several years of good old-fashioned competition between two seasoned rivals — not universal information services. ■

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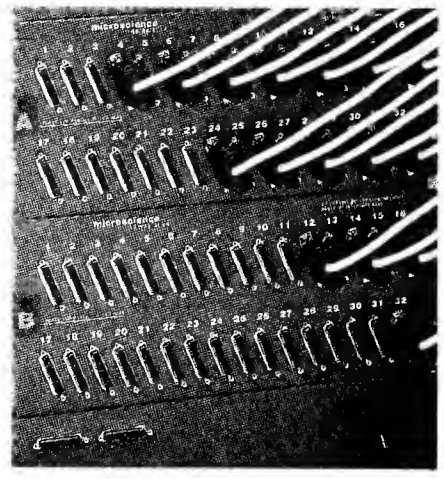

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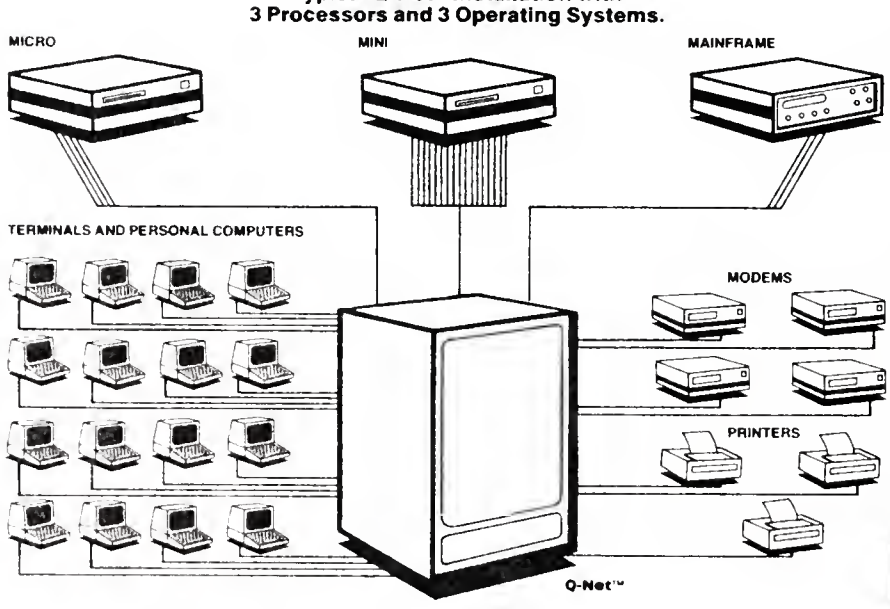

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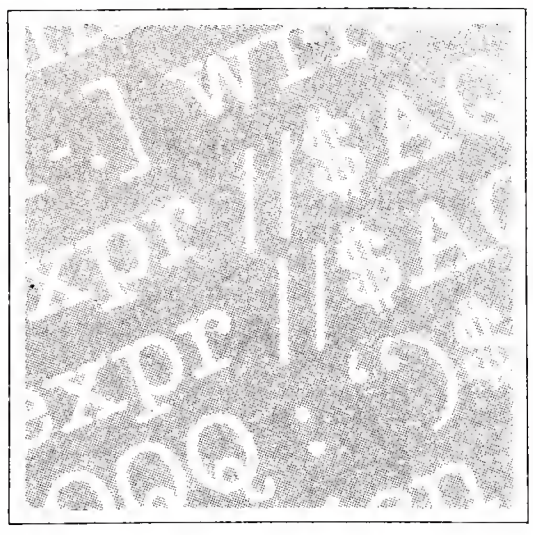

Users press Icon into commercial service

This public domain language represents an advance in state-of-the-art nonnumeric computing: more powerful than Pascal, faster than Unix shells and easier to write than C or LISP.

By O. Richard Fonorow

The Icon programming language is emerging from its origins at the University of Arizona. This powerful language represents an important advance in state-of-the-art nonnumeric computing.

Originally developed for academic use, Icon recently spawned versions for AT&T Unix and Microsoft Corp.'s MS-DOS and now runs on a variety of commercial computers. The Unix port in particular indicates that Icon bears watching.

"Programmers like it," says one user, AT&T's Jerry Nowlin. "When they [learn Icon and then] graduate to the business or engineering world, they're going to want to program in the language with which they're most comfortable."

Icon is closely associated with the SNOBOL4 language, but its string-handling facilities are more extensive, combining several novel ideas with properties similar to those in languages as diverse as Prolog, LISP, C and Pascal. Nowlin calls it "the closest thing to programming in English I've been able to find."

The language was designed in 1977 by Professor Ralph E. Griswold and his colleagues and students, with support from the National Science Foundation, and resides in the public domain. For years, Icon suffered from the image attached to public domain software: "If it's free, it can't be any good."

Indeed, a full-blown implementation of a language and support system in the public domain is a rarity. But now that the language has been ported to Digital Equipment Corp.'s VAX/VMS machines, AT&T's 3B20, Sun Microsystems, Inc.'s Intel Corp. 68000-based Sun workstation and other high-performance systems, its use has begun to spread through the commercial world.

Icon fills a particular gap in the language hierarchy of Unix. "The combination of shell and C leave a large middle ground that Icon is perfectly suited to fill," Nowlin explains. "C leaves much to be desired when it comes to string manipulation and pattern matching" — two of Icon's strong suits.

Another strength is Icon's ease of use. Enthusiasts claim an average person familiar with programming languages can pick up the Icon text and start writing useful programs after the first 50 pages. The particular advantage in a Unix environment lies in Icon's low program development costs.

Joe Hall, a member of the technical staff at Bell Laboratories, points out, "When algorithms coded in Icon are found to be less than optimal, they are discarded and completely rewritten. In other, harder-to-write languages like C, less-than-optimal algorithms are modified and tweaked forever because the investment put into the original work was so high."

Very Basic

In this light, Icon looks like a good candidate for becoming the Basic of the high-performance environment: It is an easy-to-learn, easy-to-use language for the one-time, throwaway programs that at the same time contains sophisticated capabilities for the more dedicated software developer.

At present, the University of Arizona, which distributes Icon and its documentation, has sent out approximately 1,000 copies of the software. But the university's department of computer science reports a great increase in requests

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O. Richard Fonorow is a member of the technical staff at AT&T Information Systems Laboratories in Naperville, Ill. He learned Icon as a student at the University of Arizona, spread the word at AT&T and now serves as the laboratories' resident expert.

for the language since the MS-DOS version was released in September.

As it happens, thousands more copies already lie in the hands of users, who may not even know they have it. Icon is distributed as user-contributed software on the University of California at Berkeley 4.2 version of Unix itself, and the MS-DOS version has shown up on several electronic bulletin boards. Icon is becoming available and widely distributed, but its power and efficiency are just beginning to be tapped.

The name Icon was chosen to denote that the language was new and not simply another version of SNOBOL4 recast with a more modern syntax. Nevertheless, Icon was influenced by its predecessor and there are some similarities.

In SNOBOL4, goal-directed evaluation provided the basis for — but was limited to — pattern matching. Icon's reach is broader. It is a procedural language with expressions that are capable of producing multiple results. The uncommon programming mechanisms that drive these expressions are called generators.

Success and failure

After discovering generators, Icon's inventors abandoned the basic SNOBOL4 framework in favor of one that made it possible to incorporate these new programming mechanisms. Icon's generators extend the realm of automatic goal-directed evaluation throughout the entire language, opening a wide variety of interesting new programming techniques.

> *In contrast with more conventional languages with ALGOL-like syntax, Icon relies heavily on the notion of success and failure and comes with a large repertoire of built-in string manipulation functions.*

In contrast with more conventional languages with ALGOL-like syntax, Icon relies heavily on the notion of success and failure and comes with a large repertoire of built-in string manipulation functions. It automatically allocates and withdraws storage for variables; local scope declarations are optional.

According to Bell Laboratories' Hall, "In Icon, the string is a true data type of the language. Thus, strings are handled in reasonable ways in all contexts." Variables can assume any type during program execution, and type conversions are performed automatically. Icon, from a programming perspective, is exceptionally "friendly."

Unix applications

One reason Icon may become a regular member of the Unix system programming environment is that it is an elegant procedural language. Experienced programmers will find many familiar concepts as well as thought-provoking new ones. More compelling still, nonprofessional Unix system users requiring a general-purpose programming language may find that Icon suits their needs.

Unix has at times been labeled "unfriendly." One reason for this may be the use of expressions such as *sed*, *awk* and *expr*, which are commonly used inside Unix shell scripts that operate on strings. Although it is not the fault of the operating system, these scripts are notoriously hard to read and understand and are part of the environment associated with the Unix system. They can be particularly painful for inexperienced users.

Apparently, the problem with these shell scripts is caused by a programming niche that neither the Unix shell nor the C programming language seem to fill. To illustrate this, consider the actual Unix System V basename command that is written as the shell script:

```
# @(#)basename.sh 1.4
AQQQ=$ [1-.]
AQQQ='expr //$AQQQ :"")/
''AQQQ'
BQQQ='expr//$AQQQ :'.*/)''
expr $BQQQ : ")$2$" $BQQQ
```

This script was written and routinely is used to solve a basic string-scanning problem. It produces the name of a file by stripping the leading directory names and slashes from a single argument that is expected to be a full path name.

Icon programs that use generators to scan strings often resemble high-level pseudocode. The following is a possible Icon version of a base-name command. This version consists of a single Icon procedure:

```
# basename.icn
procedure main(arg)
get (arg) ? [
  while tab(upto('/')) &
  move (1)
  write(tab(0))
  ]
end
```

It uses Icon's string-scanning facility to examine the argument passed to the main program. While the program can tab up to slash "/" characters, the *upto* generator keeps moving the cursor past them. The remainder of the string is then written to standard output.

Icon, as illustrated, can provide efficient string-scanning solutions to problems that are otherwise routinely solved on Unix systems by writing shell scripts containing cryptic editor sequences. Even experienced shell programmers may have difficulty understanding these scripts.

Yet, like shell, Icon-executable files are smaller than C *a.out* files. Additionally, Icon programs are easier to write and debug.

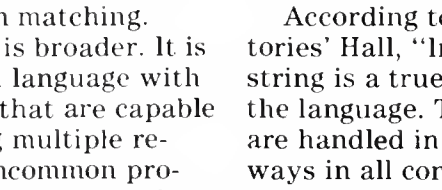
AI tool

There is another application for which Icon might prove valuable. Icon's generator-driven, goal-directed evaluation mechanism and powerful string-scanning facilities make the language suitable for use with intelligent software tools.

Artificial intelligence researchers in Canada understand this potential and recently combined Icon and Prolog into a hybrid language they call Logicon. (see "Logicon: an Integration of Prolog into Icon," Guy Lapalme and Suzanne Chapleau, University of Montreal.)

Icon might become a regular member of the Unix programming environment because of another, unrelated reason. One question many people ask is, "Can I get Icon for my home computer?" There will probably always be a need for an easy-to-use, general-purpose Unix programming language because casual or beginning users will find it too difficult to master the shell or C.

Icon's SNOBOL-like features make it a prime candidate for the role Basic currently plays on MS-DOS systems. Should people find it easy to use Icon as the de facto replacement for Basic,



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Icon may become an important adjunct to the Unix programming environment.

Language syntax

The Icon syntax resembles that of C and Pascal. Icon is not "block structured," and procedures may not be nested. Programs have one or more procedures that may optionally reside in separate Unix files. Icon procedures are composed of optional scope declarations followed by expressions.

Technically, there are no statements in Icon, so in this sense at least, the language resembles Lisp. Here is the Icon rendition of the familiar "hello world" program:

```
procedure main()
  write ("Hello World!")
end
```

As in C, program execution begins in the procedure *main*. The words *procedure* and *end* are reserved and give Icon syntax its Pascal appearance. *Write* is a built-in function. The term "function" is used to refer to built-in C procedures that are already part of the language. Icon has a large collection of these built-in functions.

Naturally, strings are an integral part of the Icon language. They are a separate data type, and like Basic or SNOBOL4 strings, they can be assigned to variables. There is no limit, other than those imposed by machine architectures, to the length of strings. A two-word descriptor is employed internally to store the string's length and its beginning address in memory.

There are no more special characters in Icon strings (such as the C null terminator), so all characters are equally valid. This contrasts with C, where strings are manipulated at a lower level, and programmers must rely on convention.

Icon operators are inherently polymorphic because variables may assume any valid Icon type during the course of program execution. This allows the same operator or procedure to be used differently, depending upon the type of its argument(s) at the time of expression evaluation.

The same programmer-defined "element counter" procedure could be used, for example, to count the number of lines in a file, the characters in a string or the members in a list.

The size "*" operator returns the size of its argument and is a good example of a built-in polymorphic operator that can be used with different types of data.

Generators

Generators lie at the heart of the Icon programming language. Several languages have limited control mechanisms called generators. Icon's generators are unique because they are interwoven throughout the entire fabric of the language. Although the word "generator" sounds imposing, the concept is simple enough.

Expressions in most other languages are only capable of computing and producing, at most, one result. Some languages, such as SNOBOL4, allow expressions that do not produce any results, and when this happens, these expressions are said to fail.

Generators were developed because expressions that can only produce one result may waste potentially useful information contained in the expression-evaluation mechanism at runtime. Normally explicit means have to be provided for retaining this kind of information. Icon generators do this internally.

> ”
>
> *Icon's generators are unique because they are interwoven throughout the entire fabric of the language.*

The standard example used to introduce generators is that of finding substrings in a longer string of characters. An expression that contains a function, usually called *find*, is used to look for substrings.

If the substring is found, most other languages can be used to illustrate the conventional methods of looking for the next occurrence of the substring. These languages make it necessary for the programmer either to add constructs to remember the previous occurrence or to find all previous occurrences before looking for the next one.

The Icon *find* generator, on the other hand, allows programmers to find successive occurrences with a single expression until it no longer produces a result (that is, there are no more occurrences) and then fails. It is not necessary for Icon programmers to add extra code for remembering the state that the expression was in when it produced the last result, although they could if they wanted.

The point is that Icon generators make the normal bookkeeping of these details unnecessary, and without these details, programs are more easily coded and later understood.

Although string-related examples are often used to describe generation, Icon generators are not limited to string scanning or manipulation. Every expression is potentially a generator. Some built-in functions are generators.

Generation is inherited, so that expressions with subexpressions that contain generators become generators themselves. The order in which generators produce their results is well defined but may be changed by the programmer by using

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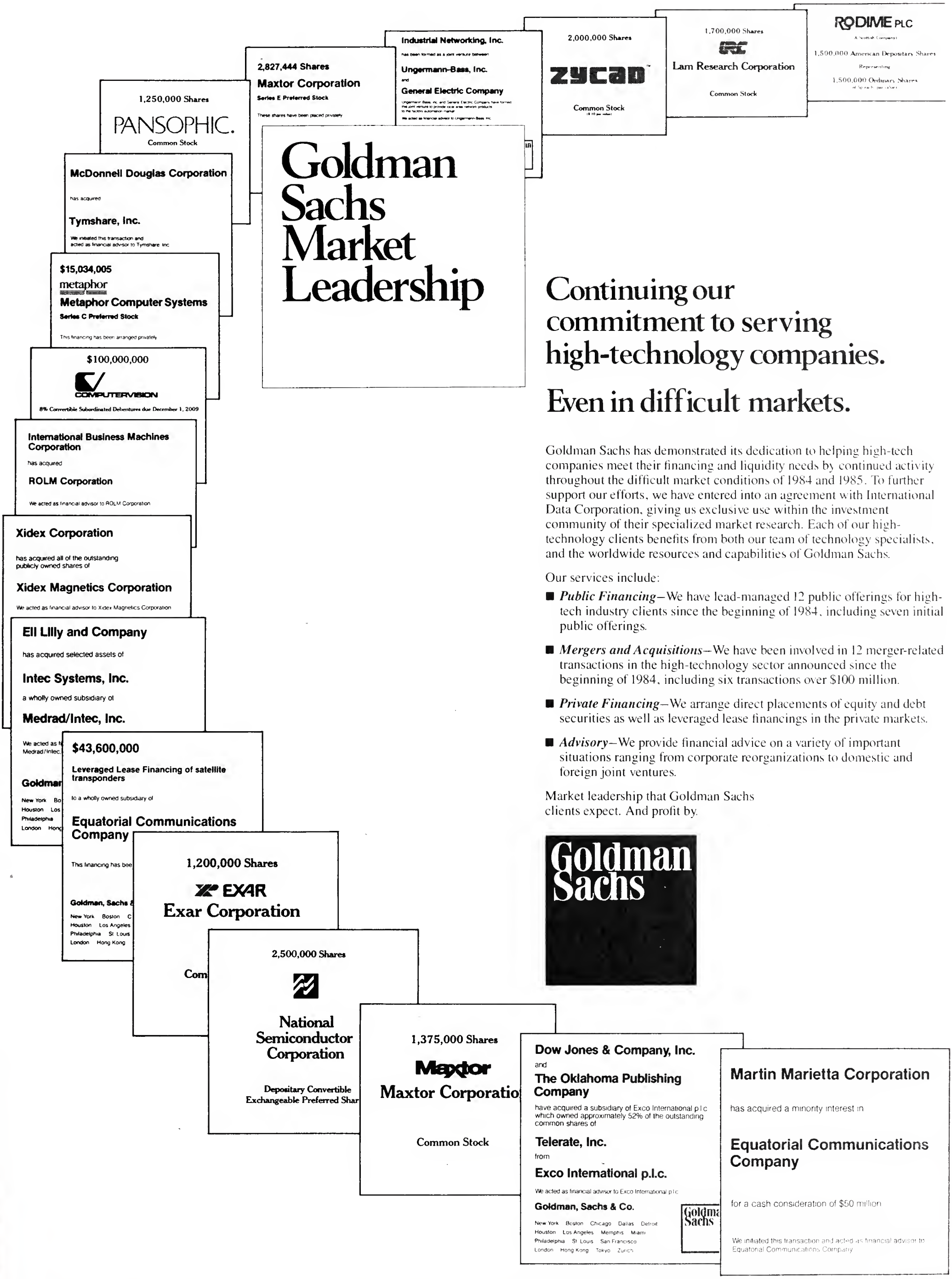

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> *Experienced programmers may find Icon programming disconcerting because familiar constructs and control mechanisms work differently than expected. . . . Once [they] no longer think in terms of a single result . . . they become more comfortable with the new semantics.*

a language mechanism called a coexpression.

Semantics

Superficially, Icon's syntax resembles other modern programming languages. Experienced programmers may find Icon programming a bit disconcerting at first because familiar constructs and control mechanisms work differently than expected. However, the novel aspects of the language are easily learned even by those with no programming experience.

The unusual semantics arise from generators and the concept of expressions that either succeed or fail. This concept is somewhat unfamiliar to SNOBOL4 programmers. Expressions in Icon that produce results succeed, and if they contain a generator, they may succeed more than once. Failure is the same as not being able to produce a result.

Once experienced programmers no longer think in terms of a single result (either true or false) and begin to think in terms of producing another result (success) or failure, they become more comfortable with the new semantics.

Icon control structures are driven by the success or failure of control expressions. This has allowed, for instance, the success and failure of pattern-matching functions to drive control structures (for example, *if-then-else*, *while* and so on) embedded in string-scanning. This makes it possible to construct string-scanning expressions that are easier to read and understand than equivalent SNOBOL4 patterns.

Goal-directed evaluation

Goal-directed evaluation is the name for the process Icon uses to produce results during expression evaluation. Many people fail to realize that goal-directed evaluation is automatic in the sense that programmers do not have to do anything special to make it happen.

Theorem proving in Prolog is similar to goal-directed evaluation, but backtracking in Icon during this process is limited to the current expression.

Goal-directed evaluation is responsible for the somewhat unexpected semantics associated with the conjunction operator "&" and the disjunction operator "|". With "&", the conjunction fails only after all results of the expression are produced without success.

Goal-directed evaluation has no analogy in ALGOL-like languages without generators. It occurs only in Icon expressions that contain one or more subexpressions with a generator.

If a subexpression fails, previous subexpressions are resumed, if possible, and the process continues until the outermost expression produces a result or fails. This is probably best illustrated with an example.

Consider the built-in Icon function *find (s1, s2)*. It is a generator that produces the numerical positions of its first argument, *s1*, in its second argument, *s2*. The expression

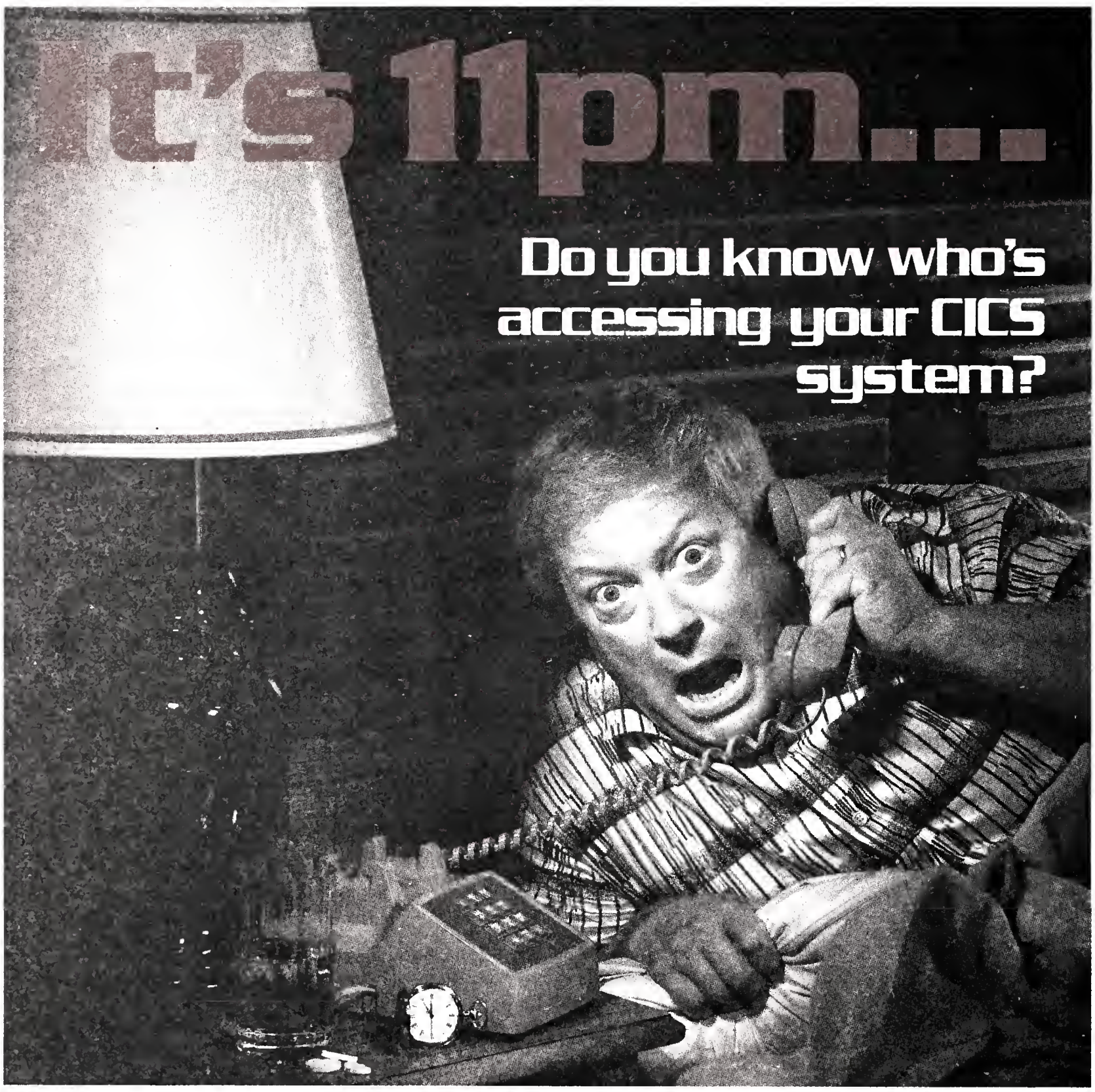
find("oo," "look at the book by the brook!")

is capable of producing 3 numerical results:

Look at the book
2 27

by the brook
27

The series of results that a given expression is capable of producing are considered its result sequence. This result sequence can be presented as *[2, 14, 27]*.



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Now consider the following expression:

find("oo," "look at the book by the brook!") >10

This expression is asking if there is an occurrence of the substring "oo" after position 10 in the second substring. The answer is yes, and this expression will succeed because of goal-directed evaluation.

The sequence of events is as follows:

— *Find* is activated and produces its first result, 2.

— Since 2 is less than 10, the (greater-than) expression fails, and the *find* generator is automatically resumed and produces its next result, 14.

— Since 14 is greater than 10, the expression succeeds, and goal-directed evaluation ceases.

Note that the final result is not required, so the *find* generator is not resumed to produce it.

Goal-directed evaluation allows programmers to write shorter and more natural programs. Consider the classic "welfare crook" problem from parallel programming. The problem is to find a common name among three separate lists of names. For the purposes of this example, assume the Icon variables L1, L2 and L3 are Icon lists of names created by the following expressions:

L1 := ["paul," "john," "george," "ringo"]
L2 := ["peter," "paul," "mary"]
L3 := ["peter," "luke," "paul", ". . ."]

Although these lists contain string constants, lists in general can be composed of any valid type, even other Icon lists. It should be pointed out that lists can be created in other ways and that the language is rich with built-in list access methods (such as *push*, *pull*, *pop* and *get*). After these three lists have been created, the following expression

write(!L1 == !L2 == !L3)

uses goal-directed evaluation to satisfy the equalities and will write the first name that is common to all three lists.

The "!" *bang* operator is an Icon generator that produces elements. It is useful to consider "any member" as a euphemism for *bang* when used in the context of goal-directed evaluation. This way, the above Icon expression reads:

write any member of L1 that equals any member of L2 that equals any member of L3.

Most data types (such as lists, records, files, strings, csets, tables or sets) can be made to produce their members using *bang*. List members here are strings that represent names.

The *every* control structure makes all generators exhaustively produce their results so that

every write(!L1 = !L2 = !L3)

produces all the names that are common to all three lists.

Runtime system

Icon is technically an "interpreted" language, but this term is misleading. Although Icon programs execute with the help of an assembly language interpreter, or "decoder," and runtime system, the help is usually transparent. Additionally, Icon programs are not interpreted in in the same way as other classically interpretered languages.

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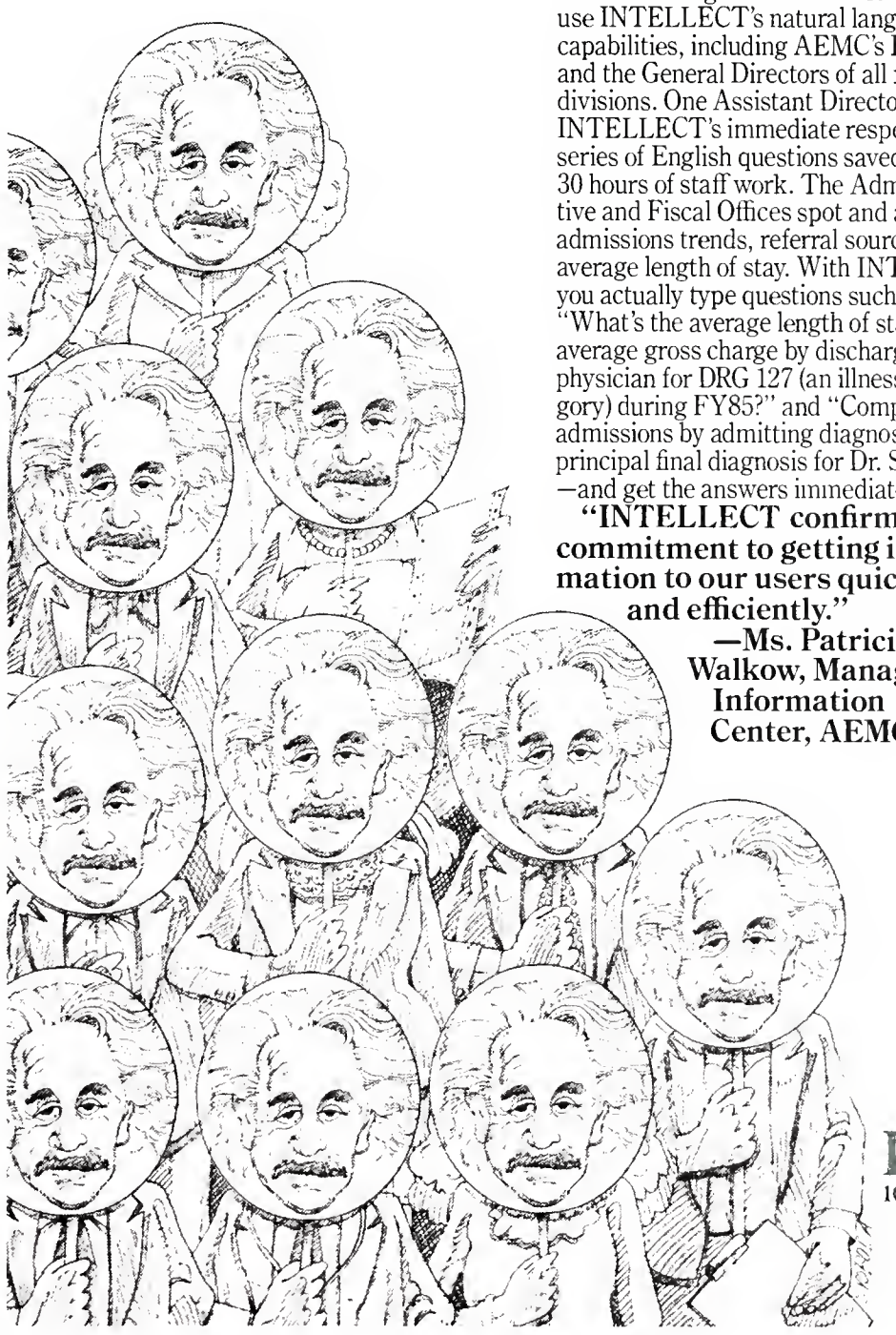

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Programs are translated before execution in much the same way as a normal compiler. Rather than link-editing and producing executable load modules, programs are translated into an "abstract" intermediate code (similar to Pascal's pcode) called ucode. Ucode files can be linked together to produce another form of the abstract code called icode, with all references resolved. Linking is normally done automatically after translation.

Users consider these icode files to be identical to C load modules (*a.out* files). From their perspective, little difference exists between C or Icon when translating and running programs, except that the time required to link edit (Unix *ld* command) and produce an executable load module is not necessary. This maks the Icon translation sequence faster than normal C compiles.

> ❞
>
> *Both powerful and expressive, with new and often unrecognized properties, Icon can be used to solve a class of string-oriented problems that might otherwise be solved cryptically using the Unix shell.*

In order to translate and link the "hello world" program assumed to be in the Unix file *hello.icn*, the user types

icont hello.icn

Then, if there were no errors, the user simply types in the name of the translated program minus the *.icn* suffix (in this case *hello*), just as one would any standard Unix command.

When the Icon program is executed, it then executes the assembly language interpreter. The interpreter reads and then executes the program contained in the remainder of the icode file using the binary-encoded abstract instructions.

Regarding program interpretation, it is important to understand that abstract incode instructions cause precompiled built-in C routines to execute. These routines are in memory as part of the runtime system. After the C routine is completed, control returns to the interpreter, and the next abstract instruction is executed. The interpreter also pushes arguments, procedures and local variables on the Icon stack. Other instructions provide the interpreter with current file and line number information used by the tracing mechanism and for runtime error messages.

Icon vs. C

It is interesting to note that Icon icode files are usually much smaller than corresponding C load modules (*a.out* files) because the work at runtime is done by the resident Icon runtime system. Also, C load modules typically duplicate much of what is contained in other executable load modules, particularly the print library. The byte totals (unstripped) from the executable files of the usual *hello world* program written in both languages on an AT&T 3B20S are as follows:

```
1133 a.out
1505 hello
```

The *hello* file is the Icon icode and the *a.out* file is the C load module.

Presently, Icon is much faster than pure shell. After the Icon runtime system has been loaded into memory, many representative programs run with speeds that compare favorably with C. In those instances where performance seems to suffer in comparison to C, the cause is usually very high-level constructs performing to a multitude of string operations and comparisons, such as associative table lookups.

The other reason Icon's performance can suffer in comparison to C is that Icon is typeless, and type conversions are performed automatically during program execution. Although this feature is an integral part of the language and useful for "one-shot" program development, it also means that type checking must be done, as it is in Basic and shell, throughout program execution instead of when the program is translated.

Icon's combination of power, efficiency and programming ease can be used to advantage in most Unix system programming environments. As a possible replacement for Basic, Icon may become an important addition to the Unix system for small computers. Both powerful and expressive, with new and often unrecognized properties, Icon can be used to solve a class of string-oriented problems that might otherwise be solved cryptically using the Unix shell. In a wider perspective, Icon can be used to solve many other complex problems outside the realm of text processing.

Several colleges and universities now offer Icon in their computer science curricula. Many allow students to write translators, compilers and assemblers in Icon, permitting students to focus squarely on the translation and code generation task without letting the vagaries of a lower level language get in the way. This suggests that Icon translators for new language will be comparatively inexpensive, making it economical to design simple languages for casual computer users. ■

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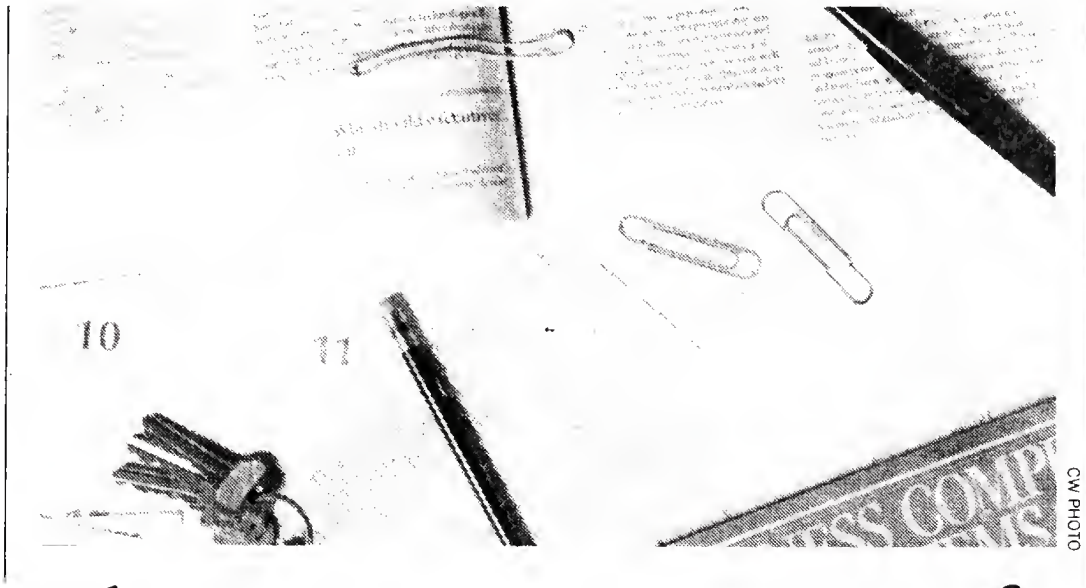

CW PHOTO

Multiple-session software emulates a messy desk

Using multiple-session software can mean up to 100% productivity improvements from nearly instantaneous response time when users switch environments. But some packages are better implemented than others.

By John Kador

A host of new software products that allow parallel activities have raised the state of the art in interactive and on-line systems. Users, no longer content to remain tied to a single environment, can now access other environments on a multiple-session basis.

These new multiple-session software products, all introduced in the last two years, run as applications under mainframe operating systems such as MVS. Transparent to users, the software allows switching between applications and environments with few keystrokes and reduced system overhead.

Packages include Pie from Technologic Software Concepts, Inc.; TPX from Duquesne Systems, Inc.; Multses from Westinghouse Learning Corp.; Sim/Session from Simware, Inc.; Tubes from Macro 4, Inc.; Nova:log from Uccel Corp.; and Ca-vterm from Computer Associates International.

Juggling stacks of paper

Programs such as these have come into demand because information professionals cannot predict the timing of their needs for information or when they will need to switch files in the middle of a task.

Switching environments is analogous to the way most people use their desks at work. People pile a desk with stacks of papers and folders containing information. While reading or writing in one stack, a worker can pause, reach for another stack, work in that environment and return to the original stack without losing his place.

Thanks to a number of multiple-session products, end users can access multiple environments in much the same way. Users can actually

---

John Kador is president of Kador Communications in Melbourne, Fla.

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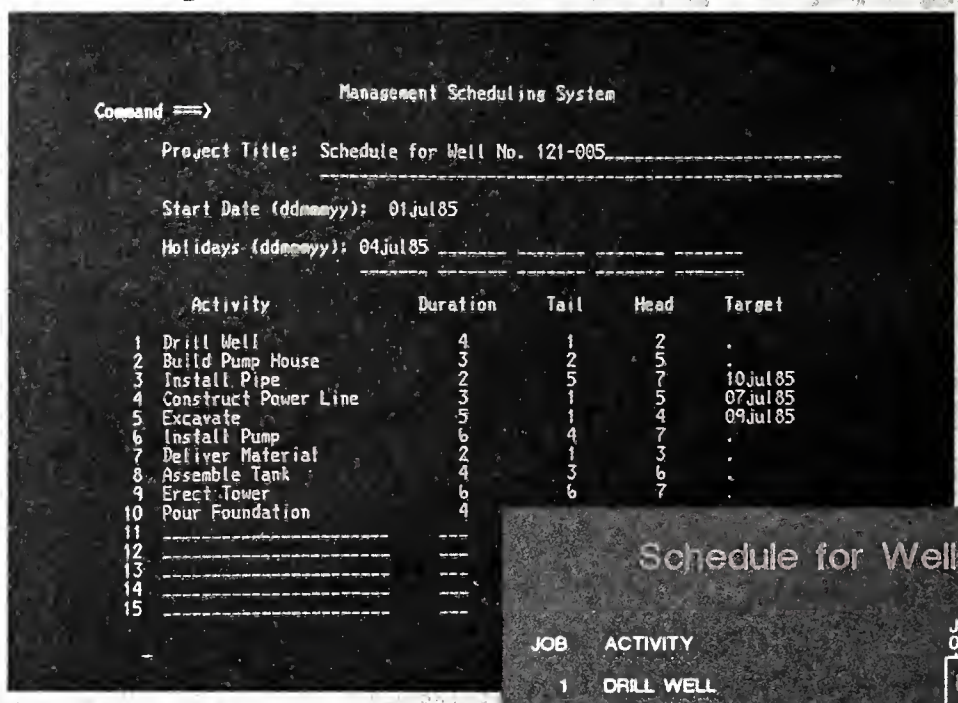
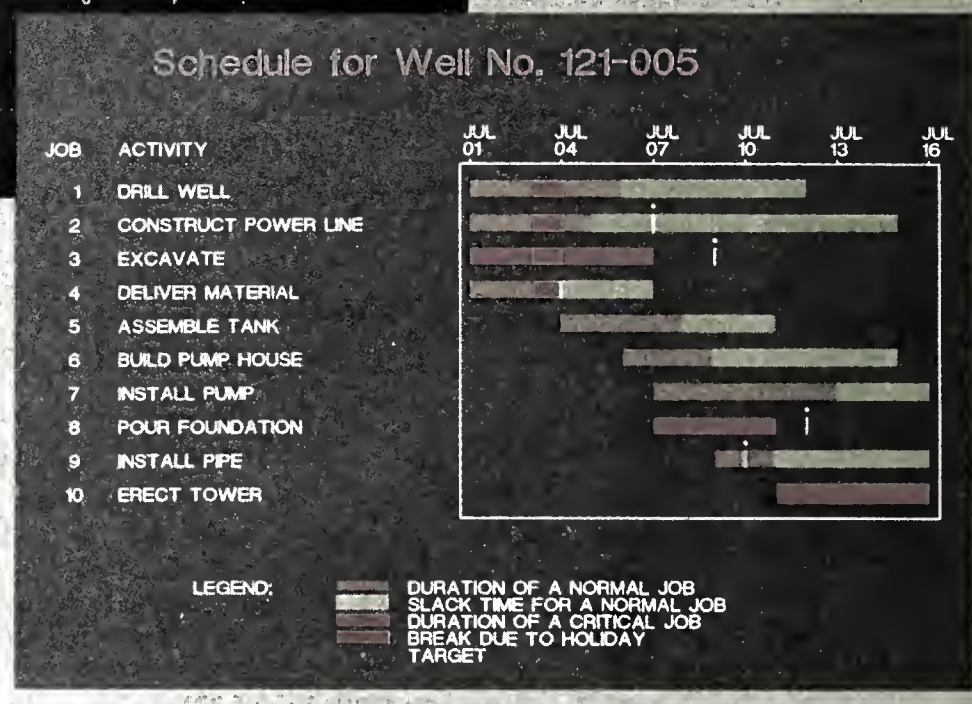

Management Scheduling System
Command ===>
Project Title: Schedule for Well No. 121-005
Start Date (ddmmmyy): 01jul85
Holidays (ddmmmyy): 04jul85
Activity Duration Tail Head Target
1 Drill Well 4 1 2 .
2 Build Pump House 3 2 5 .
3 Install Pipe 2 5 7 10jul85
4 Construct Power Line 3 1 5 07jul85
5 Excavate 5 1 4 09jul85
6 Install Pump 6 4 7 .
7 Deliver Material 2 1 3 .
8 Assemble Tank 4 3 6 .
9 Erect Tower 6 6 7 .
10 Pour Foundation 4



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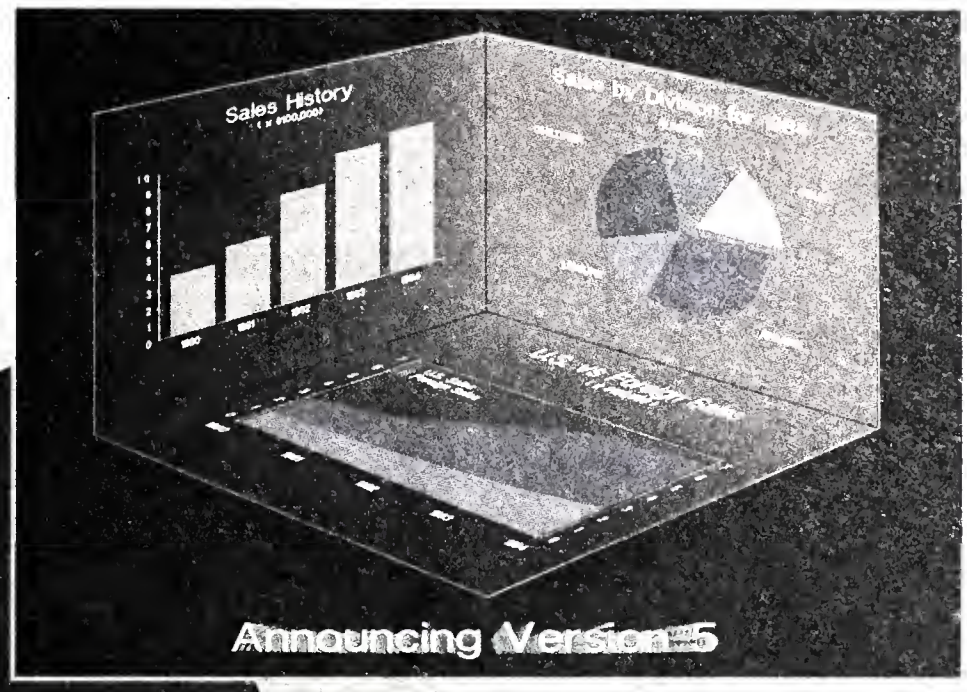

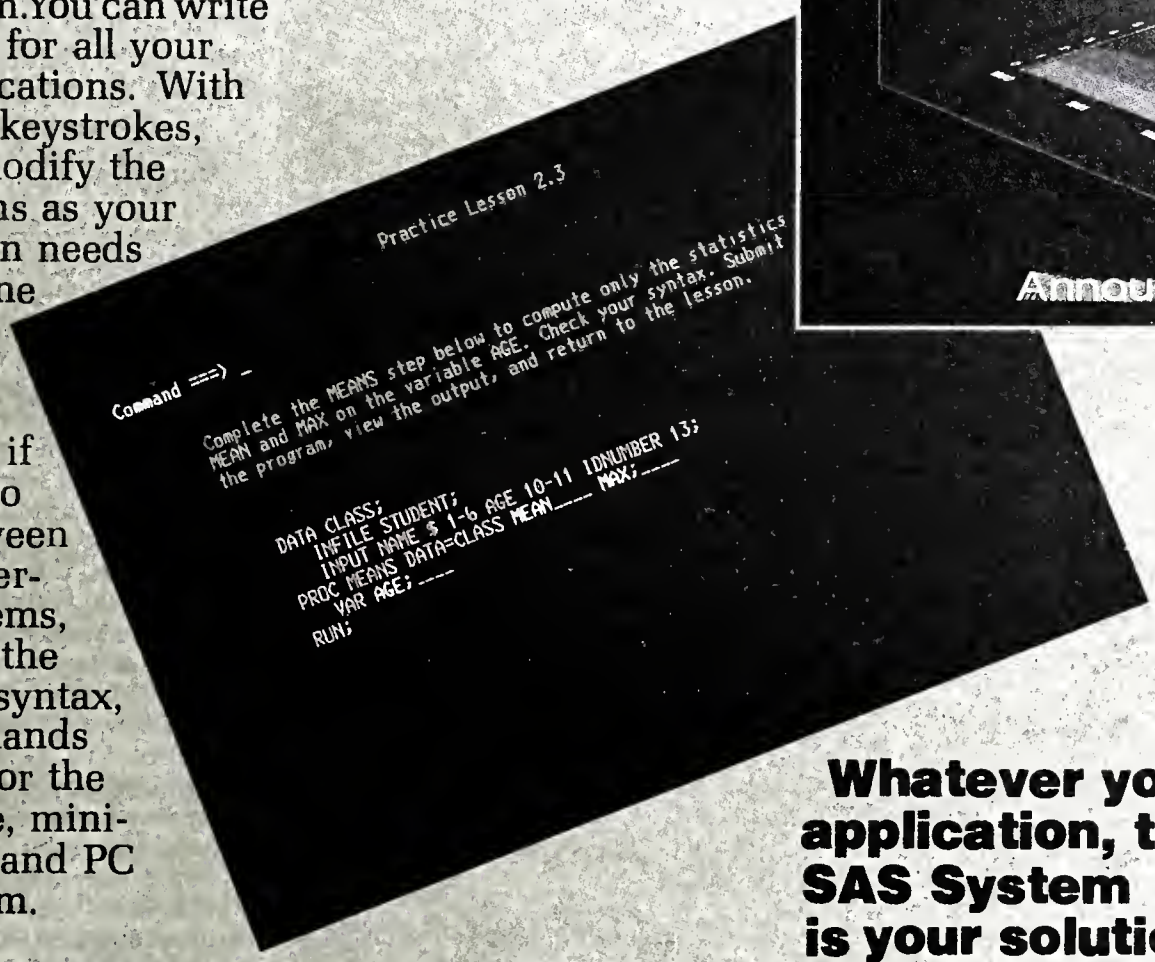
Practice Lesson 2.3
Command ===>
Complete the MEANS step below to compute only the statistics MEAN and MAX on the variable AGE. Check your syntax. Submit the program, view the output, and return to the lesson.
DATA CLASS;
INFILE STUDENT;
INPUT NAME $ 1-6 AGE 10-11 IDNUMBER 13;
PROC MEANS DATA=CLASS MEAN MAX;
VAR AGE;
RUN;

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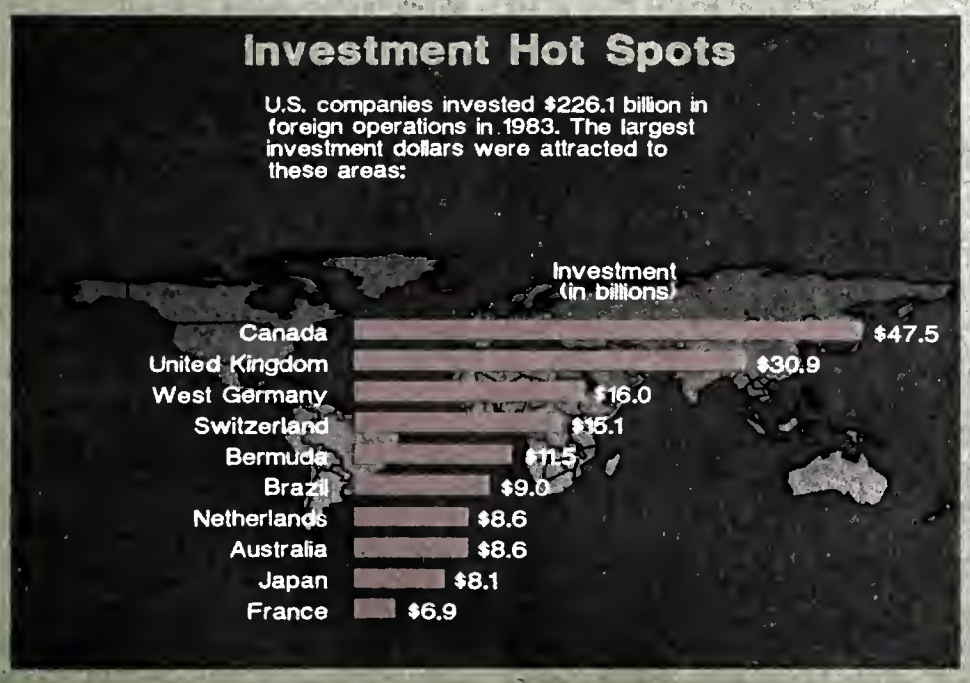

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switch back and forth between up to 16 different sessions, saving displays — down to leaving the cursor in the right place — exactly as they left them.

For instance, a customer representative entering a work order on the computer may need to "pause" the data entry to research a back-order delay schedule that is based on a different on-line system. In another example, an applications programmer testing an application needs to make notes while testing. Without multiple session software, the programmer must log off, go to a data base to make notes and log back on to the application being tested.

Expensive hardware solutions

Before the advent of multiple-session software, the only alternative for on-line access was to give users a separate terminal for each session. Many desks have been burdened with two or more display terminals for this reason.

More recently, new types of terminals such as the IBM 3270 Personal Computer have offered another option — using firmware to allows users to be logged on to four sessions at once via logic built into terminal. But these hardware solutions are costly. Among other things, the $8,000 or $9,000 spent on the specialized terminal only serves one user. The cost of keeping two or more standard terminals in each office must be measured not only in dollars but also in resource consumption, since multiple ports are used to connect the terminals to the mainframe.

Multiple-session software offers more efficient, less expensive solutions. Potential buyers should be aware that there are major differences in design, usability, cost and resource consumption between the available multiple-session products. Certain criteria are fundamental to a sound purchase decision.

One principal requirement for all multiple-session packages is providing user control. Because users control their work and are interruptible, they must be allowed to determine the next action or the proper environment to select. All multiple-session packages provide this control to a degree, but some have more sophisticated capabilities.

In addition, users must be able to tailor their interfaces. User customization options include the ability to decide which keys are designated to perform certain actions (such as switching environments) or even the location and designation of the environments users will use. They could designate one key for an IMS environment in Boston and another key for a CICS in the Toronto branch.

One of the most critical characteristics of any interactive or on-line system is response time. While the actual response time may not be completely under the control of the software designers, the designers must develop a system that provides a level of response time that does not interfere with human processes. Generally, users will tolerate one- to three-second response times, although the actual length of the delay is less important than keeping the response times consistent.

Successful users will feel and adjust to the rhythm of the system. If the rhythm is relatively fast, they will get more work done. Multiple-session software is ideal for users who strive to make maximum use of automation power. In fact, installations using multiple-session software that offers parallel activities report an average of 100% improvement in productivity because of nearly instantaneous response time when users switch environments.

Traffic director

Multiple-session software packages reflect two design philosophies. The simplest approach to design is based on central VTAM switching. A separate switching subsystem in the mainframe serves as the traffic director between all application subsystems and real terminals.

The subsystem is implemented as a started task in a separate address space acting as a primary logical unit (PLU) VTAM application for real terminals and as secondary logical unit (SLU) virtual terminals for the application subsystems.

All data traffic to and from real and virtual terminals must pass through this separate address space to be filtered for switching and transferred to the proper terminal. The PLU/SLU designations put the virtual terminals for applications in the slave position.

Using a central VTAM switching address space provides VTAM application menus, so terminal users can see a list of available applications. The menus remove the complexity of logon APPLID terminology.

Central switching provides application signon, too. Some multiple-session products provide a language that allows an installation to preprogram conversations that would take place between the terminal and any application. Although this may seem like a complex undertaking at first, the end-user "friendly" result may well justify the effort.

Monitoring and control are other features of central switching. Special control and diagnostic facilities, including status/resource displays and tracing, are available for trouble-shooting and performance analysis of the VTAM switching system.

Although the switching approach is extremely simple and is used by most multiple-session packages, it has four major limitations:

■ Administration — Every user, every application and every terminal must be explicitly defined by the program to be assigned address space. For an environment of 100 or more users, doing so requires a full-time administrator. Also, for a user to access an application subsystem such as TSO multiple times, he must have two or more subsystem IDs.

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For more information on the C-1 system and its available software, contact: Convex Computer Corporation, 701 N. Plano Road, Richardson, TX 75081, 214 952-0200.

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■ Security — Users must add another level of security to protect access to the switching system (to determine who can use which applications). This may mean developing multiple-level interfaces to popular security products such as RACF, ACF2 and SURVEILLANCE. Unfortunately, extra security levels also add enormously to the amount of overhead per end user, since each must log on two times or more. The alternative is to use no security in the switching system.

■ Reliability — Since the switching address space controls all application subsystem interaction, it must be the most reliable component of the network. If any user were to cause a catastrophic error, it would wipe out all users of the switching address space.

■ Performance — An address space of 5M to 10M bytes is not unusual for a small group of users — even 10 to 15 people. Because this separate address space must continually be dispatching work, filtering and so on, it can consume excessive amounts of CPU resources. Benchmarks of systems using this approach show that 100 users will cause significant overhead even on a mainframe as large as an IBM 3081.

For MVS users, there is also a physical restriction on the number of users because of paging considerations. Each time a page fault occurs, this entire switching address space must stop because of an MVS restriction and let MVS satisfy the page fault. During this period, no work can be processed by the switching address space.

Furthermore, the standard CPU overhead imposed by VTAM terminal control is always doubled. The switching address space always processes an application subsystem display interaction through its virtual terminal and then again through its real terminal.

The performance problem of using a separate switching address space can best be understood by analogy. Imagine that every telephone call you now make, whether local or long distance, was suddenly forced to pass through a telephone operator in Japan. A delay would occur not only from the transmission going back and forth to Japan but also from having the operator translate your call after each sentence you spoke.

Techniques of storage fencing, adding more memory, increasing CPU speed, or restricting number of users can be expected to have any effect on response time. But in general, response time to application subsystem users using the switching address space will be degraded considerably over their normal native response time.

In effect, using a switching address space is the same as adding a new on-line system, such as CICS, above all application subsystems. Such an approach brings with it inherent performance, security and administrative concerns.

Playing the percentages

User productivity studies done by the IBM users group, Share, indicate that users who require access to parallel environments spend 75% to 80% of their time in a single environment and "exception out" to a different environment. Which environment is "preferred" depends on the tasks the end user normally performs. Programmers writing programs spend the majority of their time in the editing environment. Customer agents spend the majority of their time in an on-line transaction environment. The preferred environment could be TSO, VM/CMS, CICS, IMS, NCCF or others.

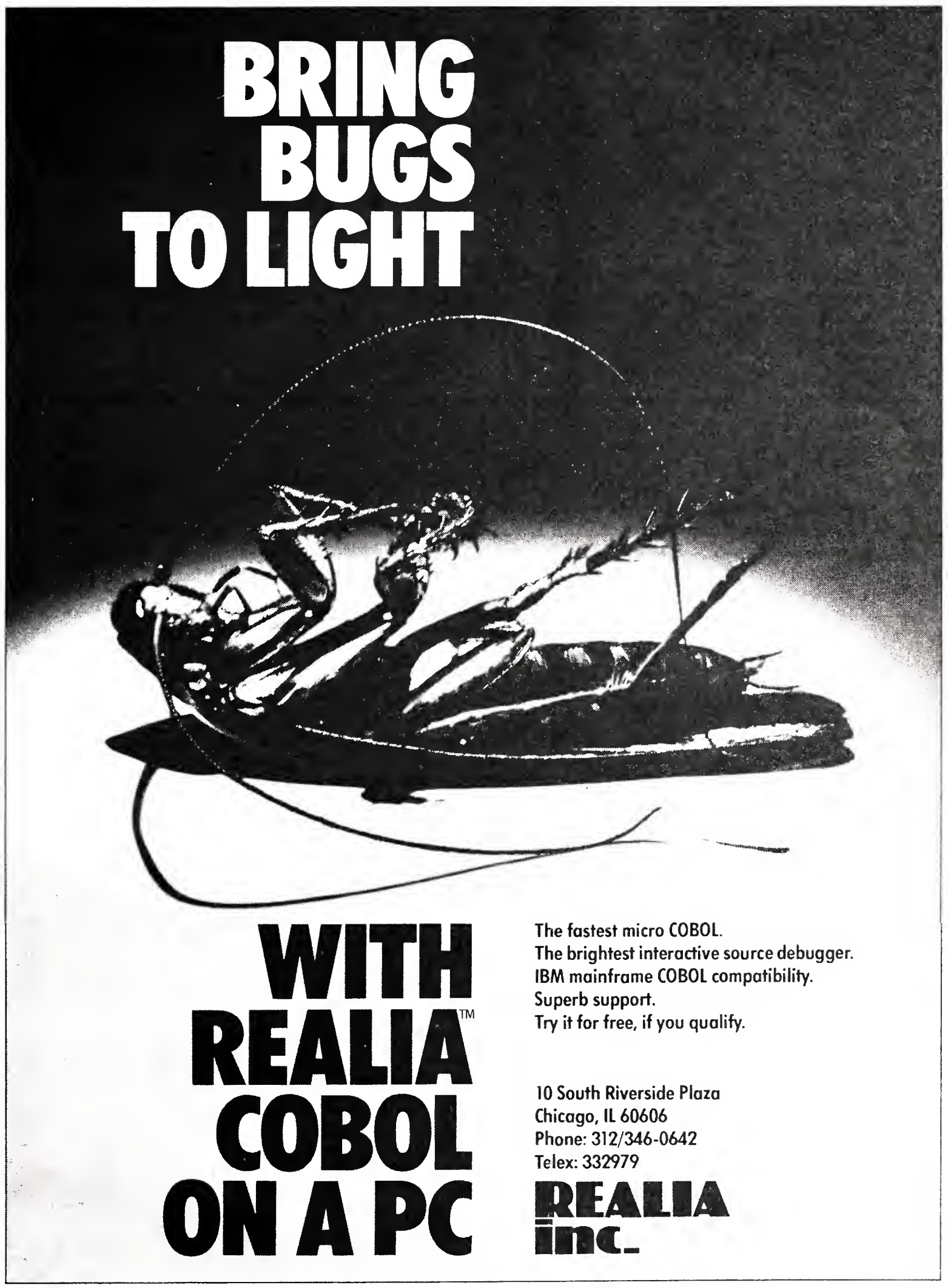
"User productivity studies done by the IBM users group, Share, indicate that users who require access to parallel environments spend 75% to 80% of their time in a single environment and "exception out" to a different environment.

The other design approach to multiple-session software, therefore, takes advantage of the slant toward a preferred environment to create a more efficient switching system. Users can switch between applications, transactions or commands in their preferred environment without passing through any separate switching address space.

The PIE series uses this approach. Here, the switching takes place on a local level, since the multiple-session software does not run as an application under the operating system. Instead, it runs as an application under the environment designated "preferred" by each end user. Thus, each user has his own switching system.

This design eliminates the previously discussed problems with overhead and response time delays. Multiple-session capability functions within a user's preferred environment to increase productivity in that area as the user opens multiple applications under that environment. Then, the user can "exception out," for multiple sessions of any applications in any environment.

In a preferred environment, there is no additional overhead for maintaining multiple sessions. The individual switch does not require the extra level of management that the



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central switch requires.

This design approach was originally used by IBM in its implementation of Network Control and Communications Facility (NCCF). For network control operators, NCCF is the preferred environment for using Network Problem Determination Application, Network Logical Data Manager and so on.

The exception environments are accessed by the Terminal Access Facility from one of the preferred environments by a command. The network control operator can switch from any environment back to native NCCF by pressing a single key.

Multiple-session software designers are using this technique for their own designs. The preferred-environment approach solves the problem of fast native access to parallel preferred environments and exception access to any other environment.

The multiple-session software juggles applications in the preferred environment and simply administers network access to the rest of the mainframe system resources.

The current architectures of these preferred IBM environments under PIE, for example, includes the following:

ment, with exceptions out to CICS, IMS and VM/CMS-Professional Office System.

- The VM-preferred environment, with exceptions out to MVS/CICS, MVS/IMS, DOS/CICS and MVS/TSO.
- The CICS-preferred environment, with exceptions out to IMS, TSO and other CICS regions.

Low overhead

Performance benchmark tests show that the resource consumption used by the preferred environment design to switch from environment to environment is quite low. In some cases, switching between environments consumes less than the overhead associated with pressing the ENTER key once under ISPF.

In addition, no measurable extra overhead exists for any activity in the preferred environment. Since the preferred environment consumes 75% to 80% of a user's activities, there is no extra load placed on the system. Response time is not degraded by excessive logon/logoff activities.

Paging is not a problem. The exception environment access is made from the preferred environment and not from a separate switching address space. If the preferred environment is well tuned, then the exception environment will not be hindered in any way.

By using a combination of the preferred environment and exception environments, installations have been able to add hundreds of end users without any increase in resource consumption. The overhead saved by handling multiple sessions via switching software covers the additional users, because each user only has to log on once.

The only noticeable trade-off is a temporary increase in working set size (for TSO-based users) just after an environment switch. If the user stays in an environment for a few seconds, the operating system will recover any excess frames.

Security and administration are built in. Users are automatically secured, based on their preferred environment. No additional administrative overhead is added, and the facilities of the preferred environment can be used without additional training or education. Also, reliability is not compromised. If one user causes a catastrophic error, it does not affect any other users.

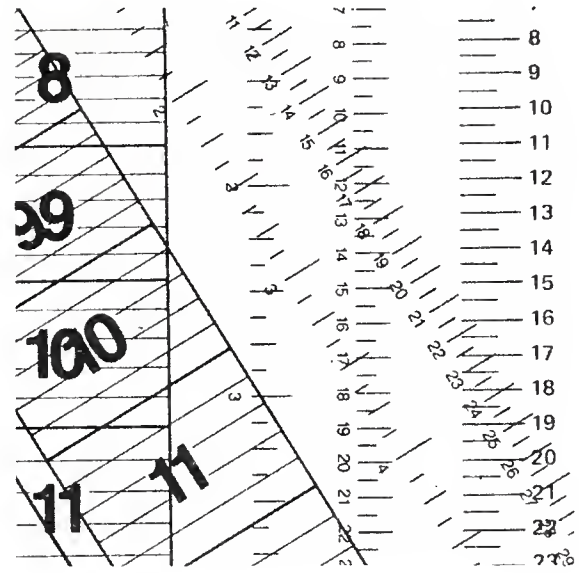
The choice of a central switching address space offered by systems such as TPX, MULTSES, SIM/Session, Nova:log, CA-VTERM or the preferred environment of PIE depends on the installation's evaluation criteria and priorities. Some products shine in pilot tests using a small group of evaluators, but when you switch to production use, you will find that resource consumption goes up considerably or response time goes down.

But if you choose wisely, multiple-session products can increase productivity by allowing users to move between applications without logging off or disconnecting. ■

IN DEPTH

Function points: The new measure of software

On time, within budget, satisfied user and benefits achieved — all spell a job well done. Now a new efficiency ruler called Function Points measures the productivity of application software, helping managers justify projects and demonstrate improved productivity.



By John Vacca

Function-point measurement is a method of characterizing the size and complexity of applications, based on the amount of function delivered to the users. This new technique is designed to help managers justify projects and show improved productivity.

The technique was first developed by Alan Albrecht, a member of IBM's senior technical staff. It is widely used throughout IBM's internal applications development groups.

A cooperative industry study on software development and maintenance productivity was conducted in March 1985, coordinated by J. Edward Kunkler of Xerox Corp. In the report, productivity improvements trends were observed and compared across companies with productivity measurements deemed acceptable by industry standards.

Data was submitted by 19 companies, from which a number of comparisons could be made. The trends that have emerged from the data should be considered more significant than the actual numbers, since there is some subjectiveness to the method of counting function points.

There seemed to be a honing in on the same results, even with the changing composition that emerged. Function points provide a valid industry measurement for productivity because of the stability in the results. Productivity, as used in this report, was expressed in terms of the number of work hours required to generate one function point.

Tools and methods that normally influence the rate at which productivity improves are normally classified as "attributes." Data can help answer specific questions, such as "Does subsecond response time really improve productivity and at what price?"

The specific numbers derived from this data are relative. A company will most likely see trends developing as it collects and analyzes its own data over time and makes comparisons with results from other companies.

According to Kunkler, function points for an application are evaluated by the following:

- Considering an external boundary around the application software.
- Listing each of the following major data or control user function types as viewed by the user.
- Classifying each of the user function types to the information processing function.
- Counting the occurrences of each possible combination of user function type and level of information processing function.
- Weighting each of the combinations by a factor to measure the level of information processing function provided by the data control types.
- Adjusting the resulting sum to account for general information processing function by applying a factor.

John Vacca is a free-lance DP contract writer and computer security consultant based in Topeka, Kan.

In addition, Kunkler points out that the function point measure has been chosen for certain reasons. The measure isolates the work-product measure from the attributes, facilitating the analysis and identification of attributes that improve productivity.

Also, the measure is based on the users external view of the application. The counts classifications and general characteristics can all be determined early in the development cycle as soon as the external design has been completed.

Measures of work effort are needed in order to complete a productivity measurement. Differences in work practices at the various development and maintenance sites can cause the measures to differ, even though these measures have been conceptually straightforward and have been used for many years. Therefore, Kunkler explains, "the conversion factor between net and gross work effort should be determined and stated by each organization with their productivity measures."

In order to ensure that the similarities and definitions across companies are close enough to provide meaningful comparisons, the specific areas where data is being collected are limited. This study, therefore, has suggested additions and deletions to a company's working set of attributes.

Effectiveness measures have also been established by some companies. On time, within budget, satisfied user and benefits achieved are some of the typical measurements for successful projects. On the other hand, how well we do our professional tasks can also be measured by the efficiency key, which could ask for example, "Are we competitive? Are we improving?"

With these effectiveness measures, comparisons can begin to cut across languages and technologies to determine those attributes that improve productivity and to identify those attributes that should be discontinued. Languages and technologies are less sensitive to the analysis with function points.

Quality is the final aspect of measurement. At present, quality is even more evasive than effectiveness and efficiency measurements. The number of abends, ease of modification, maintenance costs, defects per function point delivered and so on are all quality measures that have been suggested.

Of the 266 projects reviewed by the 19 companies, 118 were programmed using Cobol, 22 using PL/1, 42 using a so-called fourth-generation language such as Focus, and 84 using a mix of the available languages (Figure 1).

Language trends

James Kealey, senior systems consultant of productivity and quality assurance for the Bank of America in San Francisco, says "There appears to be a trend toward projects using more than one language. In fact, a very large development effort we have is to make using a mixture of languages a lot more easier for developers." The majority of the bank's projects are developed in Cobol. For the purpose of measurement, most of these are also measured in Cobol — with some fourth-generation languages.

Areas that are affecting the precision and efficiency of delivering applications software demonstrate both positive and negative industry trends.

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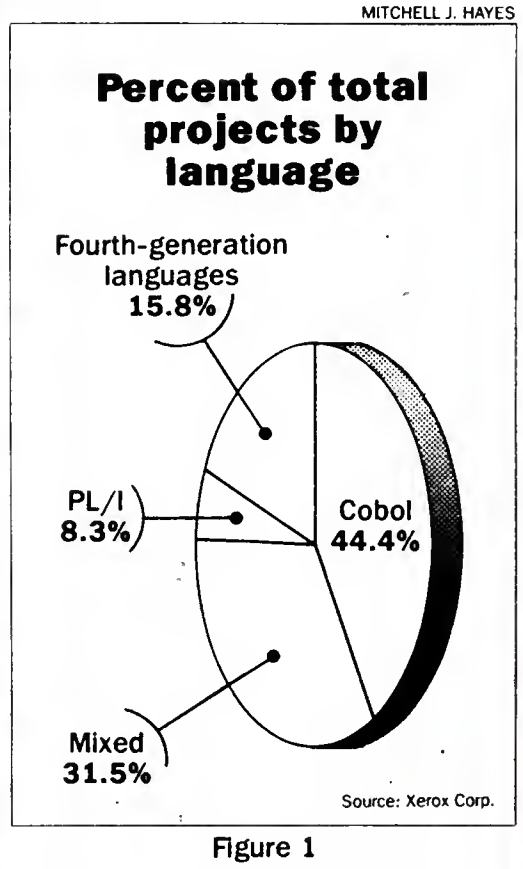

Figure 1

Positives. Increased automation of software development is made more affordable through decreasing computing costs. "Software development," Kunkler says, "continues to be labor intensive."

Kealey explains, "What we've done in the bank is show that by spending more in enhancing our development environment, we'll get a favorable trade-off on labor."

There's an increased availability of higher-level languages. "This has provided the capability for prototyping in some areas," Kealey notes.

Commercial software

As the software development process matured, software factories emerged. Via such options as commercial software packages, adaptation of existing in-house software (reusable code) and program generators, software productivity can be improved by using already available software. "If you do an adequate analysis of an application," Kealey says, "you might want to consider its use in the design phases."

There appears to be a significant amount of growth in the availability of applications development tools and methods. "Here at the bank," Kealey observes, "[The availability of application development tools] has grown both with those that we obtain ourselves and those that are a

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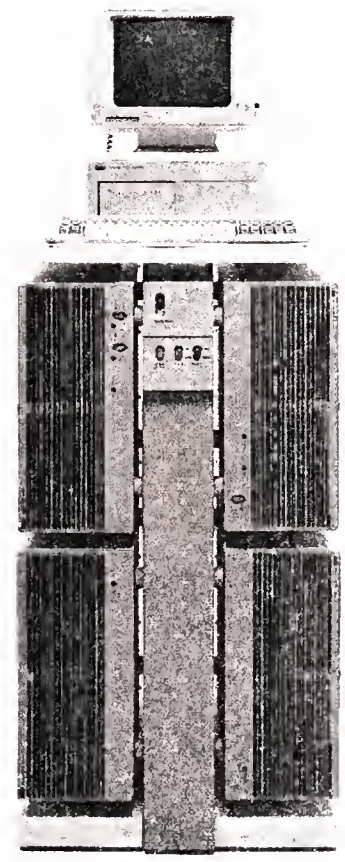

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separate unit. Actually, these tools and methods have been developed specifically for the bank's applications programs."

"There must be a greater focus on data strategy vs. traditional application strategy," Kunkler says. In the face of business change, this will extend the life of application software.

Negatives. "There appears to be no real textbook on software creation — an art vs. science approach," Kunkler notes. "In addition, there also appears to be a two- to five-year lag in the application of modern tools, methods and languages."

Excessive learning cost and dissipation of scarce support resources are caused by the proliferation of technical environments. "Because of the restructuring of our technology," Kealey explains, "[Our environment] is geared to avoid excessive learning cost/dissipation of scarce support resources."

Methods and tools

It is assumed that there should be a shift over time to increase the percent of time, effort and costs to earlier phases of the systems development life cycle vs. the design and procedure development phases. An overall decrease in time, effort and costs, as well as an improvement in quality, is the net effect of the shift. "That's been demonstrated," Kealey states, "both on our quality matrix measure and productivity plus the results of the time-caption system that we have.

Kunkler recommends that a company look for improvement over its measurement period, such as from year to year. He further recommends that, "By taking note of the languages, tools, technologies and methods used by companies achieving high productivity, a company that has not yet achieved similar productivity may wish to evaluate [these methods] for use."

Project information

The discussion will now focus on the presentation of the specific analysis of the 266 projects.

Work hours per function point by project size in work years. Larger projects generally result in lower productivity than do smaller projects. "From the results of the measurement data that we have," Kealey says, "one of the things that we do by using function points as an estimator is to allow both the client and developer to see the relationship between the size of the system and how it is used as it's developed."

Work hours per function point by project size in work hours. Productivity tends to decrease as a project increases in size. "This statement is true if it's straight development or if you don't take advantage of productivity enhancers — effort enhancers," Kealey says. "Those things are within the development of control. Obviously, with the use of this data and our own internal data, we would want to minimize the impact of the size [on productivity] because at the bank, we have to develop very large projects."

As stated earlier, higher level languages offer the greatest productivity, followed by PL/1 and Cobol, respectively. "However," Kunkler states, "higher level languages tend to be used on smaller projects."

Lines of code for PL/1 and Cobol. The study also examined the number of lines of code generated for one function point. A greater number of lines of code for Cobol than for PL/1 is a clear indication of higher productivity. "When you look at function points," Kealey notes, "the lines of code are actually necessary to deliver functions."

Function points: An explanation

The purpose of this part of the discussion will be to provide each application development and maintenance site with a consistent way to measure, portray and demonstrate the productivity of their application development and maintenance activities. It is also intended to help distinguish good development and maintenance actions and characteristics from bad ones and to help improve the estimating process.

An effective application development and maintenance productivity measure should accomplish several objectives, according to Kunkler:

- It should consistently determine the productivity and productivity trends of application development, enhancement, implementation or period support activity or projects relative to others similar activities at the site and at other sites.
- It should promote actions or decisions that can improve the output of the site.
- It should demonstrate the results of the actions taken to improve the output of the site.
- It should support the estimating process at the site.
- It should support the management process at the site.

For most productivity measures, two basic measures must be established first: One must define work-product output, and the other must define work effort input, or cost (Figure 2). Productivity is work product divided by work effort. "Its trend should be up," Kunkler says. Unit cost, on the other hand, is work effort divided by work product, and Kunkler says its trend should be down.

An application development activity, project or site is placed on a relative scale by the productivity measure or unit cost. Relative placement is determined by the attributes of the application, activity, project or site.

"It is desirable," says Kunkler, "that the work product measure be meaningful to the nontechnical user. The user can then review and agree with the work-product measure

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applied to an activity or project.

The work-product measure should allow choices among technologies in order to encourage a number of options for improving productivity. Without change in the output measure, the measure should accomodate new approaches, such as higher level languages, code generators and shared applications.

"The activities and tasks in application development and maintenance are interdependent," Kunkler says. The productivity of later development tasks can be affected by the quality and completeness of early design tasks.

Estimating

In order to estimate an application development and maintenance activity or project effectively, the following three activities must be accomplished first:

- The tasks must be identified, listed and sized.
- An estimate must be developed based on tasks.
- Using other methods, the estimate must be validated.

Without regard for organization lines, all of the work effort used to accomplish the tasks, activities and phases of the pertinent process should be included. "For example," Kunkler says, "if a user works on design tasks for an application development project, the user's time should be included in the work effort for the project."

One must balance the desire to record only a few factors against the need to avoid overlooking those really influencing productivity when selecting the attributes of an application development activity, project or site to be measured and recorded. Generally, the analysis proceeds as follows:

- A series of productivity measurements are made and recorded.
- In order to see which characteristics or attributes are most often associated with higher productivity and/or least often associated with lower productivity, the known characteristics of the activity, project or site must be systematically examined.
- To determine the attributes' effect on productivity and how completely they explain the deviations from "average," those attributes that seem to be most important should be analzyed more completely.

Function points defined

This part of the discussion will center around the basic definitions supporting the measurement, recording and analysis of function points, work effort and attributes.

Development work-product and support work-product measures. Development productivity is usually measured by counting the function points added or changed by the development or enhancement project. "We're counting development work product," says Ed Anspach, assistant vice-president for the Development Center at Harris Bank in Chicago.

Support productivity should be measured by counting the total function points supported during the support period. "What we've been doing," Anspach notes, "is counting all of our original applications and getting the starting point. We're now starting to measure development."

Measurement timing. The indicated measures should be recorded at various times in the application life cycle in order to provide the work product, work effort and attributes records needed for each development, enhancement or support project to be analyzed.

> *Quality is even more evasive than effectiveness and efficiency measurements. The number of abends, ease of modification, maintenance costs, defects per function point have all been suggested as quality measures.*

For each development and enhancement project, the estimated development work product, estimated work effort and planned attributes should be determined at the completion of the external design phase, when the complete user external view of the application has been documented.

Common applications development. Development centers responsible for common applications should provide data when announcing the end of the requirements and internal design phases. This will provide a consistent base for planning and measuring the installation, support and enhancement of common applications.

Application boundaries. When counting function points, a single, continuous external boundary should be considered. The user should specify or approve the characteristics of the data exchanges among the multiple stages and that the application be developed in multiple functional stages.

"These multiple functional stages," Kunkler says, "should be counted, estimated and measured as a separate application, including all inputs, outputs, interfaces and inquiries crossing all boundaries, because it is intended to be managed as a multiple project."

Brought-in application code. If the project team selected, modified, integrated, tested or installed the

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code, the function points provided by a brought-in applications code, including an internal shared application or a purchased application, should be counted.

For example, the function points should be counted when provided by an application obtained from another site or project and installed by the project team.

Consider all users. Since each application may have a provision for many specified user functions, all users of the application should be considered.

"If the user functions are specified to be provided by the development team," Kunkler states, "[these] user functions should be included in measuring the development work product."

Function points measure

The function points measure is accomplished in three general steps:

- Classify and count the five user function types.
- Adjust for general information processing function.
- Make the function points calculation.

According to Kunkler, "Each unique user data or user control input type should be counted when entering the external boundary of the application being measured and should add or change data in a logical internal file type."

If the external design requires a processing logic different from other external input types of the same format or if it has a different format, an external input type should be considered unique.

For external output types, "Each major logical group of user data or control information in the application as a logical internal file type should be counted," Kunkler states.

From the user's viewpoint, each logical group of data that is generated, used and maintained by the application should be included in each logical file or within a data base.

Within each application, files passed or shared between applications should be counted as external interface file types. Each major logical group of user data or control information that enters or leaves the application as an external interface file type should be counted.

Function points overview

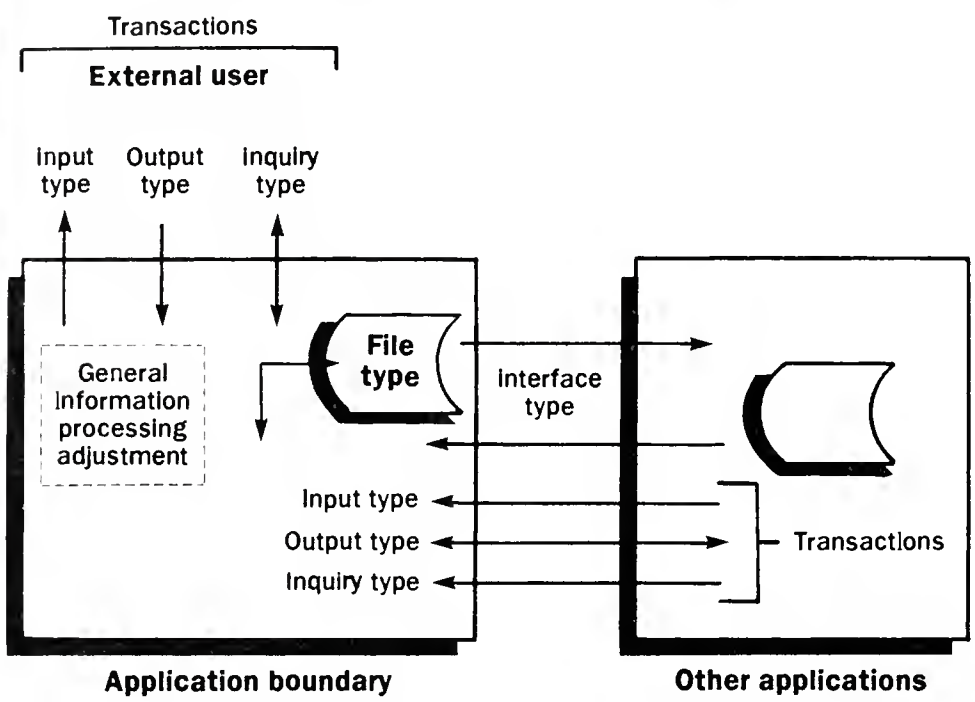

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Figure 2

Information processing

For each project that is to be used in productivity measurement and analysis or estimate validation, a record of estimated and actual work effort is needed. "To record the actual results most reliably," observes Sig Haglund, research and development specialist for Electronic Data Systems Corp. in Dallas, "we have used a systematic method of accounting for work effort."

Each characteristic or attribute of a project that might be measured and recorded for future analysis should be considered. "In the context of this analysis," Haglund states, "an attribute can have a significant effect on productivity."

Can it be changed? "Well," Haglund notes, "that depends heavily on the level of management involved and time available to make the change."

Will an attribute be variable at a project site? "Yes," he says. "An attribute that is unvarying across all the activites and projects at a site cannot be used to explain deviations among the projects at the site."

Validating estimates

The documentation of the attributes of a project or activity might be considered almost too easy. "Then," Haglund explains, "the inadequacies of a simple checklist are discovered." The degree to which a tool or technique applies to the project cannot be described by a simple yes and no.

Each estimate should be validated by using two or more estimating methods and looking for reasonable consistency among the estimates. "The function-point work-product measure provides a way to get one of

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the validating estimates," Haglund explains.

The following discussion will center around the implementation of function points at a project site documented by Kunkler. The project site was recommended by IBM's Albrecht.

Function-point implementation

Kunkler recommends that the cooperative industry study guidelines to software development and maintenance productivity be studied thoroughly. Next, people with the greatest knowledge of each application should be used to help determine function points.

"Plan for a central counting group," Albrecht says. In order to maintain consistency, assign the tabulation of function points to a few people who will do it regularly and gain experience.

"These people will work with the applications people," he explains. "Both sets of people will then bring their specific knowledge to properly count function points."

Albrecht further recommends tabulating the function points on several applications installed at the project site. "Experience and confidence can definitely be built through this, he suggests. "It can also provide local function-point data for use in training."

Train people to count function points through a function-point analysis workshop, such as the one offered on-site by IBM's Information System Services, by other training groups, or an in-house education group. These workshops offer instruction in the use of the function-point measurement process to evaluate tools and techniques and to measure quality and productivity of applications development and maintenance.

The workshops also provide case studies so that attendees can learn this measurement technique through actual experience in counting function points for both an applications development project and a maintenance project.

"Initiate the counting of function points on new development and/or enhancement projects," Albrecht explains. The function-point measure should then be produced at both the end of the external design phase and the end of the installation/acceptance phase.

Furthermore, he suggests, "the function-point measure should first be established for the applications in the installed application base."

An inventory should be prepared next, listing the applications in the installed application base. Also, the function-point measure should be determined for each of the applications.

> ❞
>
> *Productivity tends to decrease as a project increases in size — if the project is straight development or if you don't take advantage of productivity enhancers and effort enhancers.*

Albrecht maintains that "as each new development and enhancement is installed, their function-point measures should be incorporated in order to maintain the application inventory function-point record." Approximations should be converted to counted function points at the next enhancement of each application if the approximations are used to establish the function-point inventory.

Albrecht notes that experiences at various IBM sites has produced the following estimates of function-point counting work effort:

- New development or enhancement project with accurate and external design document available — less than one work-hour per 100 function points.
- Installed application with external design document available — more than one work-hour per 100 function points.
- Installed application with external design document not available — more than three work-hours per 100 function points.

"Finally," Albrecht says, "A full-time coordinator for each average site of about 200 developers should participate with the applications developers in counting function points. This will help ensure consistency, perform the analysis and provide the feedback reports."

Getting results

Companies have now started to use function points as a quick and effective way of validating estimates for a number of projects. Development projects are represented by all of the data received to date.

However, there still seems to be only a limited application of function points to maintenance projects at this time. This is because most companies are collecting data on new development projects. The companies will later track these projects with regard to maintenance productivity, especially when these projects are completed and go into maintenance status.

Function points are one of few measurements that permit a spanning of technology — cutting across different computing environments and various second-, third- and fourth-generation languages. It is important to consider more than one measurement and to consider these measurements in their proper context, as with all measurement activities.

Goals for improvement should be established relative to where your company is today. It is important to consider the lessons learned by those companies that have achieved high productivity already so that your company can take advantage of their experience. ■

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Milwaukee, WI. . . . . January 22, 1986
Minneapolis, MN. . . . . December 3, 1985
January 28, 1986
New Orleans, LA. . . . . January 15, 1986
New York/New Jersey. . . December 4, 1985
Oklahoma City/
Tulsa, OK. . . . . February 12, 1986
Philadelphia, PA. . . . . November 13, 1985
Phoenix, AZ. . . . . December 5, 1985
Pittsburgh, PA. . . . . February 13, 1986
San Diego, CA. . . . . December 4, 1985
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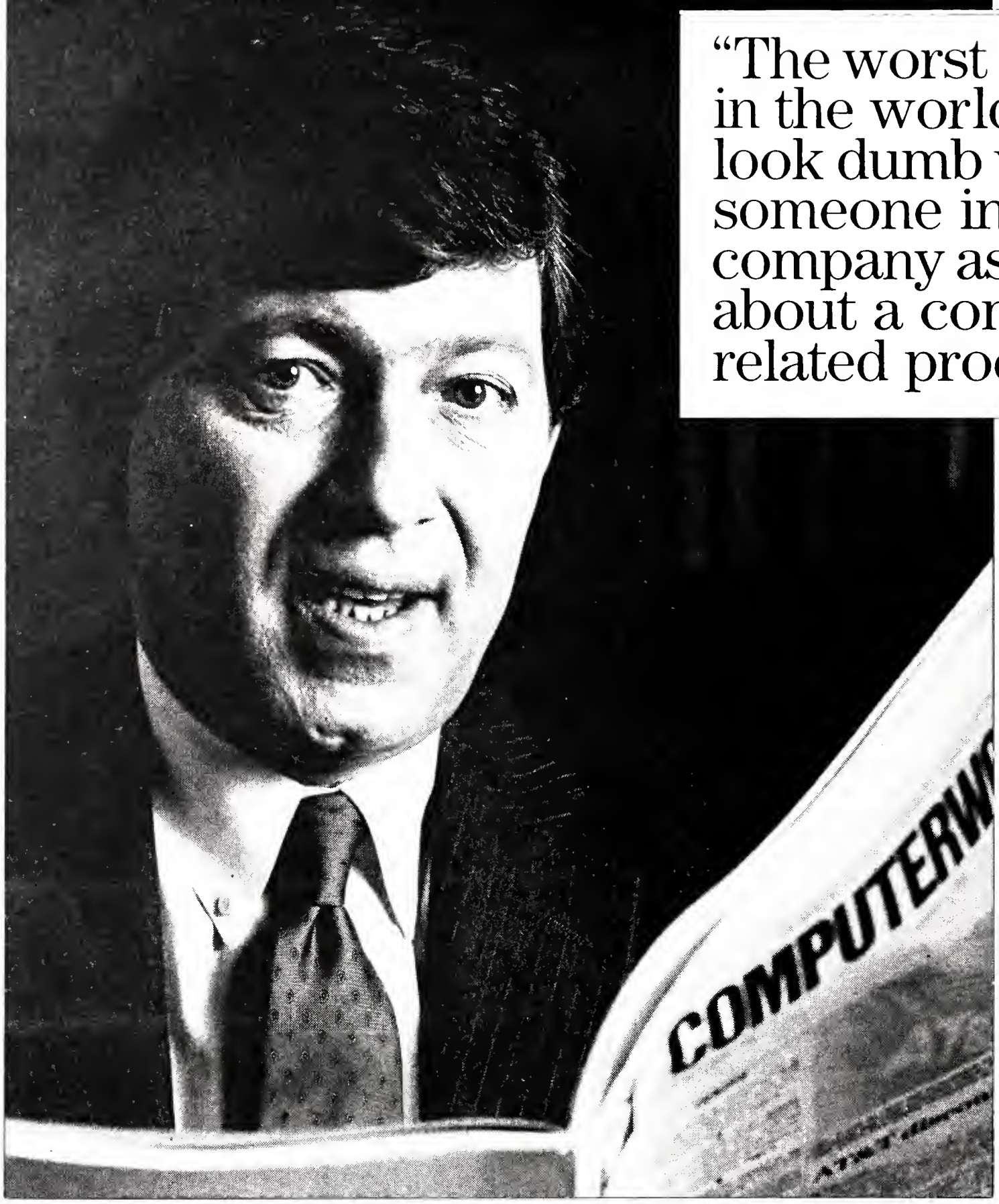

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NEW PRODUCTS

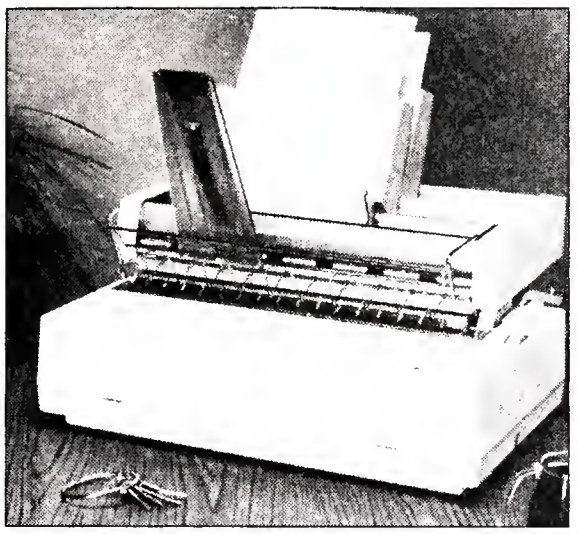
HP unwraps micro printer

Hewlett-Packard Co. of Palo Alto, Calif., has announced a letter-quality daisywheel printer designed for personal computers.

The HP 2603A gives users of IBM and IBM-compatible personal computers, HP Vectra and HP Touchscreen personal computers and HP 3000 business computers the freedom to perform many printing tasks with minimal monitoring of the printing process.

The HP 2603A prints at a speed of 48 char./sec. and has drop-in print wheels in nine fonts, including 10, 12 and 15 pitch, as well as proportional spacing. The vendor also offers a triple-bin sheet and envelope feeder and tractor accessories.

Other features include snap-in ribbons; the ability to select form length, print pitch and feeder without raising the cover; and automatic alignment of single sheets and envelopes. The HP 2603A handles many types of forms and paper including multipart forms, labels, aluminum film, mylar, NCR Corp. paper and a range of bond and xerographic papers. Either cut-sheet or continuous-feed paper can be used. There is a sound-dampening carpet included with the printer that brings the noise level to 58.5db.



Hewlett-Packard daisywheel printer works with IBM micros and compatibles.

The printer can be used with HP's HP Word, Advancewrite, HP Slate and Memomaker word processing software as well as with Multimate Corp. Multimate, Microsoft Corp. Word, Micropro International Corp.'s Wordstar and Wordstar 2000.

The HP 2603A is priced at $1,495. The triple-bin sheet feeder, HP 26030E, is priced at $845.

AT&T call tracking systems bow

AT&T Information Systems of Morristown, N.J., has introduced four business telephone call tracking systems to help companies manage costs and control use of telephone systems.

Designed for companies with as many as 5,000 telephone stations, the AT&T Call Accounting Systems — Models 300, 500, 2000 and 5000 — work with the AT&T Personal Computer 6300 or similarly configured personal computers having one floppy disk drive, one 10M-byte hard disk drive, 512K bytes of random-access memory and using the Microsoft Corp. MS-DOS operating system.

The AT&T Call Accounting Systems were designed to work with AT&T's System 75 or System 85 private branch exchanges as well as other vendors' PBXs that use direct output or internally formatted station message detail recording. (SMDR). SMDR produces a report of calls identifying associated extension, date and time the call was placed, call duration, dialed number and call cost.

The AT&T Call Accounting System software packages allow call detail collection and recording in the background while another software application operates in the foreground.

The Model 300 features support of up to 150 telephone lines. It collects up to 150,000 call records and may use 5,000 account codes. It costs $1,995.

Model 500 supports up to 500 telephone lines, collects up to 150,000 records and may use 5,000 account codes. It costs $2,995.

Model 2000 supports up to 2,000 telephone lines, collects up to 150,000 call records and may use 15,000 account codes. It costs $3,995.

The Model 5000 supports up to 5,000 telephone lines, collect up to 150,000 call records and may use 15,000 account codes. It costs $4,995.

INSIDE

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Lee Data multifunction net unit out

Lee Data Corp. of Minneapolis recently announced a network device that provides a combination of functions such as a network gateway, network server and terminal controller.

The Lanmaster supplies gateway functions between a variety of local-area networks and IBM or asynchronous hosts. Supported networks include IBM's PC Network, Protean, Inc.'s Pronet, Datapoint Corp.'s Arcnet and Ethernet.

Lanmaster supplies IBM 3274 Model 51C controller emulation and is able to support 64 mainframe sessions. Asynchronous terminal emulation provided includes Digital Equipment Corp. VT100 and IBM 3101. Remote asynchronous microcomputers can dial into the network. Lanmasters can reportedly be interconnected by a single wire.

There are two Lanmaster models. Lanmaster Model 827 features 1M byte of random-access memory (RAM), a 70M-byte hard disk, two serial ports, two parallel ports, six IBM Personal Computer-compatible expansion slots and a cartridge tape drive with 45M to 60M bytes and a price of $15,600.

Lanmaster Model 827 has similar features except that it includes 70M bytes of hard-disk storage.

Both units can be expanded to 3M bytes of RAM and up to 240M bytes of hard-disk storage.

Racal-Vadic unveils dial-up modems offering network control features

Racal-Vadic, Inc. of Milpitas, Calif., has introduced 9.6K bit/sec. and 1,200 bit/sec. dial-up modems with network control features.

The 9600VP transmits data at rates up to 9.6K bit/sec. and supports synchronous, asynchronous, full-duplex and half-duplex operations. In asynchronous mode, the product works at speeds of 300, 1,200 or 9.6K bit/sec. In synchronous mode, speeds of 1,200, 4.8K, 7.2K and 9.6K bit/sec. are supported.

The modem features automatic answering and calling of up to 15 telephone numbers with logon sequences of up to 60 characters. Also included are front-panel dialing and diagnostic capabilities and compatibility with AT&T 103 and 212A standards.

The product's automatic adaptive equalization corrects line distortion and has fall-back speeds that compensate for line quality problems.

The 9600VP costs $1,495.

A 1,200 bit/sec. modem, 1200PA, is compatible with AT&T 212 and 103 and Hayes Microcomputer Products, Inc. communications standards. It features automatic dialing and answering. Its modem manager enables a network manager to read and change options, phone numbers, logon messages and security codes.

The 1200PA has built-in error control; a full-dialing, front-panel keyboard for control; option settings; dialing; and diagnostics. It also has an LCD display for menu-style feedback and operator interface.

The 1200PA can work with modems supporting transmission speeds of 300 bit/sec. The faster modem will act as a buffer and send a character to a port whenever the buffer is full.

The modem sells for $495.

Supersoft diagnostic tests available for IBM microcomputers, compatibles

Supersoft, Inc. of Champaign, Ill., has recently released a set of diagnostic tests designed to help service technicians diagnose and repair IBM microcomputers and compatibles.

Service Diagnostics can be used to check systems in the shop or in the field to pinpoint hardware errors. It is available for microcomputers using Microsoft Corp. MS-DOS and IBM PC-DOS, and versions are available for all Digital Research, Inc. CP/M 86 and CP/M systems. It can be used to test IBM standard and many nonstandard system components.

Currently, Service Diagnostics tests the following peripheral devices: CPU and system memory, flexible disk drives, monochrome monitors, color graphics monitors, parallel and serial ports, Intel Corp.'s 8087 coprocessors, standard keyboards, fixed drives and printers.

The memory test reportedly checks every byte of available user memory, reporting errors by bit as well as by address. The disk-drive test checks the read/write and seek accuracy functions. The printer test checks every ASCII character in every character position — plus every head and carriage motion for the NEC Information Systems, Inc. Spinwriter and Qume Corp. and Diablo Systems, Inc. printers — including forward and reverse printing.

Service Diagnostics costs $225. The Dysan alignment disk costs $40.

Information appearing in the New Products section has been provided by manufacturers and has not been independently validated by Computerworld.

NEW PRODUCTS/PRICE REDUCTIONS

PRICE REDUCTIONS

Core International, Inc. has reduced the prices on its line of **ATplus** hard-disk upgrade kits for the IBM Personal Computer AT.

The new prices are as follows: ATplus20, $1,395; ATplus30, $1,595; ATplus40, $2,595; ATplus56, $3,595; and the ATplus72, $4,595.

Core International, 5151 N. Federal Highway, Boca Raton, Fla. 33431.

■

Polygon Associates, Inc. is offering a $100 discount from the list price of its **Poly-Com/220** and **Poly-Com/240** software products to users of competitors' communications products.

Users of the competing products can send in a photocopy of each system disk they are trading.

Polygon Associates, 1024 Executive Pkwy., St. Louis, Mo. 63141.

■

Natural Microsystems Corp. has reduced the price of its **Watson** voice/data system.

Watson is an add-in board for IBM Personal Computers and compatibles. The new price is $498.

Natural Microsystems, 6 Mercer Road, Natick, Mass. 01760.

■

Paperback Software International, Inc. has announced a corporate license policy for its **VP-Planner** spreadsheet program.

The license policy states that corporations will pay a one-time fee of $500 and may purchase non-copy-protected copies at a quantity discount. The cost for 20 to 49 units is $70 each; 50 to 99 units cost $60 each; 100 to 199 units cost $50 each; and 200 or more units cost $40 each.

VP-Planner costs $99.95 for a one-user license.

Paperback Software International, 2612 Eighth St., Berkeley, Calif. 94710.

SOFTWARE & SERVICES

Systems software

McDonnell Douglas Computer Systems Co. has announced **Reality '85**, an enhancement package for its Reality operating system.

Reality '85 provides users of the Pick Systems Pick-based system with consistent user interface, on-line user Help facilities, user self-teaching aids, security control features and a fourth-generation language development and prototyping environment.

Reality '85 features seven enhancement components, which are available individually or in any combination. They are improved security, new user environment terminal control language, enhanced query interface prompter, increased data basic functionalities, enhanced system capabilities, extended all functionality and natural language.

Reality '85 is priced at $20,000.

McDonnell Douglas Computer Systems, P.O. Box 516, St. Louis, Mo. 63166.

■

Program Accountability & Evaluation, Inc. has announced **Release 7** of **Tuner/38**, its storage management system.

Tuner/38 is a performance tuning system for the IBM System/38. Release 7 features the ability to change the Tuner job control structure permanently or temporarily, the ability to display history graphically, the ability to choose from three preset cycle times and the ability to assign sleep time and/or snapshot time. Tuner/38 is priced at $1,499.

Program Accountability, 7 Riverway Road, Salem, Mass. 01970.

■

Tat Graphics Group, Inc. has announced the **Sextant Graphics Display series** of software drivers that allow Sextant display systems to run with Calcomp, Inc.'s Cadvance architectural and engineering design package and Personal Cad's electrical design packages.

The driver series provides Calcomp and Personal Cad users with resolutions of 640 by 480 to 1,024 by 768 pixels on 14-in. to 20-in. screen graphics display systems.

The drivers range in price from $2,995 to $5,395.

Tat Graphics Group, Building E, 1270 Lawrence Station D., Sunnyvale, Calif. 94089.

■

Duquesne Systems, Inc. has announced **Dasdmon**, a reporting and analysis system for DASD I/O performance in IBM MVS and MVS/XA environments.

Dasdmon allows users to pinpoint DASD I/O contention problems. On-line displays provide information about DASD performance ranging from the path level to the data set level. Users may query the system about DASD resource contention.

A 99-year license costs $10,000 to $12,500.

Duquesne Systems, Two Allegheny Center, Pittsburgh, Pa. 15212.

■

Mathcom, Inc. has released **Version 4.3** of the **Mathcom Compressor**, an IBM VSAM data compression system that runs on IBM-compatible MVS and MVS/XA systems.

The Mathcom Compressor reportedly triples the amount of VSAM data that can be stored on a disk, improves response time and improves batch throughput. It includes functions to analyze current VSAM space usage and to compress existing data sets automatically.

The system license fee is $30,000.

Mathcom, 1309 City Park Ave., Fort Collins, Colo. 80521.

■

Greene Software, Inc. has announced **Sentry**, a procedure and user-level security system for the IBM System/36.

Sentry allows any OCL procedure in any library to be secured by user, workstation, date range and time of day range. No passwords are required. Security access can be controlled by user and by procedure name. All security access and unauthorized security attempts are logged for later inquiry and reporting.

Sentry is available for a one-time license fee of $495 per CPU.

Greene Software, P.O. Box 23, Victor, N.Y. 14564.

ETP Systems, Inc. has enhanced its **/USR/Tools** in-house laser publishing package by adding an interactive document formatter and full screen text editor, each operating under most versions of AT&T's Unix.

With the interactive formatter, users can set type sizes, running page headers and footers, multiple-level head formats, margins and column widths by filling in input screens. Multiple document formats can be defined and saved on disk then recalled by name.

The Rune text editor provides multiwindow multifile editing, cut-and-paste buffers limited only by disk space and built-in macro definition capabilities.

The software costs $2,295.

ETP Systems, 10150 S.W. Nimbus Ave., Portland, Ore. 97223.

Productivity aids

Graphic Software Systems, Inc. (GSS) has introduced **GSS-CGI**, a device-independent computer graphics interface for raster and vector graphics.

GSS-CGI supports distributed processing, intelligent peripherals and raster-input devices such as scanners. It provides a device-independent interface between an application program and graphical I/O devices. It decouples applications from hardware dependencies and eliminates the need for device drivers.

It supports I/O devices such as the IBM Enhanced Graphics Adapter.

GSS-CGI is priced at $175.

GSS, 25117 S.W. Pkwy., Wilsonville, Ore. 97070.

■

Simburg, Ketter, Haley, Sheppard & Purdy, P.S. Attorneys At Law has introduced the **Software Export Procedures Kit**.

The kit was designed to give software companies the tools they need to comply with export regulations. It includes a set of documents that helps users determine whether their software is eligible for export without a special license. It lists requirements for individual countries and identifies persons to whom software should not be shipped. Required export declaration forms are included along with directions for filling them out, delivering them and obtaining more forms.

The kit costs $450. Updates on regulation changes are provided free for the first year and at a cost of $40 per year thereafter.

Simburg, Ketter, Haley, Sheppard & Purdy, 2525 First Interstate Center, Seattle, Wash. 98104.

Application packages

American Software, Inc. has announced **Amsoft Querywriter**, an option for its IBM CICS/VSAM applications software running on the IBM 4300 series.

Amsoft Querywriter is said to provide on-line inquiry as well as batch and on-line report writer capabilities.

It is a specially adapted version of Software AG's Super Natural, the vendor reported.

Amsoft Querywriter costs $25,000 to $40,000 depending on the configuration.

American Software, 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

Interpretive Data Systems has announced the **HMO Application** for health maintenance organizations and provider groups rendering services to a prepaid patient population.

The HMO Application consists of five major components: premium billing, membership enrollment, referral and claims processing and reporting. The software can be used to manage multiple health maintenance organizations, monitor in-patient stays, calculate capitation payments and adjudicate claims automatically.

The HMO Application is written in the MUMPS computer language. The system can be run on a time-sharing basis or in-house at the user site. It runs on Digital Equipment Corp.'s PDP-11 or VAX series, the vendor said.

Prices range from $75,000 to $250,000 depending on the configuration.

Interpretive Data Systems, 882 Commonwealth Ave., Boston, Mass. 02115.

■

Aim Technology, Inc. has announced **Release B.2** of the **Aim Benchmark Suite II**, a software system for evaluating and comparing the performance of multiple AT&T Unix systems.

Aim Benchmark Suite II now includes a results data base of seven Unix-based systems including AT&T 3B2/400, Digital Equipment Corp. VAX-750 and Sperry Corp. 5000/80. Suite II includes 37 performance measurements and a report generator that projects systems performances based on certain application requirements.

A site license for Aim Benchmark Suite II Release B.2 costs $3,950, and a corporate license costs $11,850. Current licensees that subscribe to the update service will receive the new release free. The update service is available for $1,000 per year.

Aim Technology, Suite 390, 4655 Old Ironsides Drive, Santa Clara, Calif. 95054.

■

MacKinney Systems Co. has announced two software programs, **CICS/Spy** and **CICS/Calc**.

CICS/Spy allows an IBM 3270-type CRT screen to be viewed from another CRT. It can be used to monitor another terminal for demonstration purposes, for quality control or for help in diagnosing problems on other terminals. It runs on DOS, OS and MVS.

CICS/Calc is a spreadsheet for IBM mainframes. In addition to standard arithmetic functions, it has built-in statistical and financial functions and date calculations. It has a batch program and an application program interface. It runs on DOS/VSE.

CICS/Spy is available for $495 or a $195 annual lease. CICS/Calc costs $2,995.

MacKinney Systems, Suite 112, 2674-A S. Glenstone, Springfield, Mo. 65804.

■

Viktor Programming & Consulting Services has announced a **date utility** for DOS/VSE, VM and MVS operating systems.

The date utility was designed to help with problems involving the

Continued on page 114

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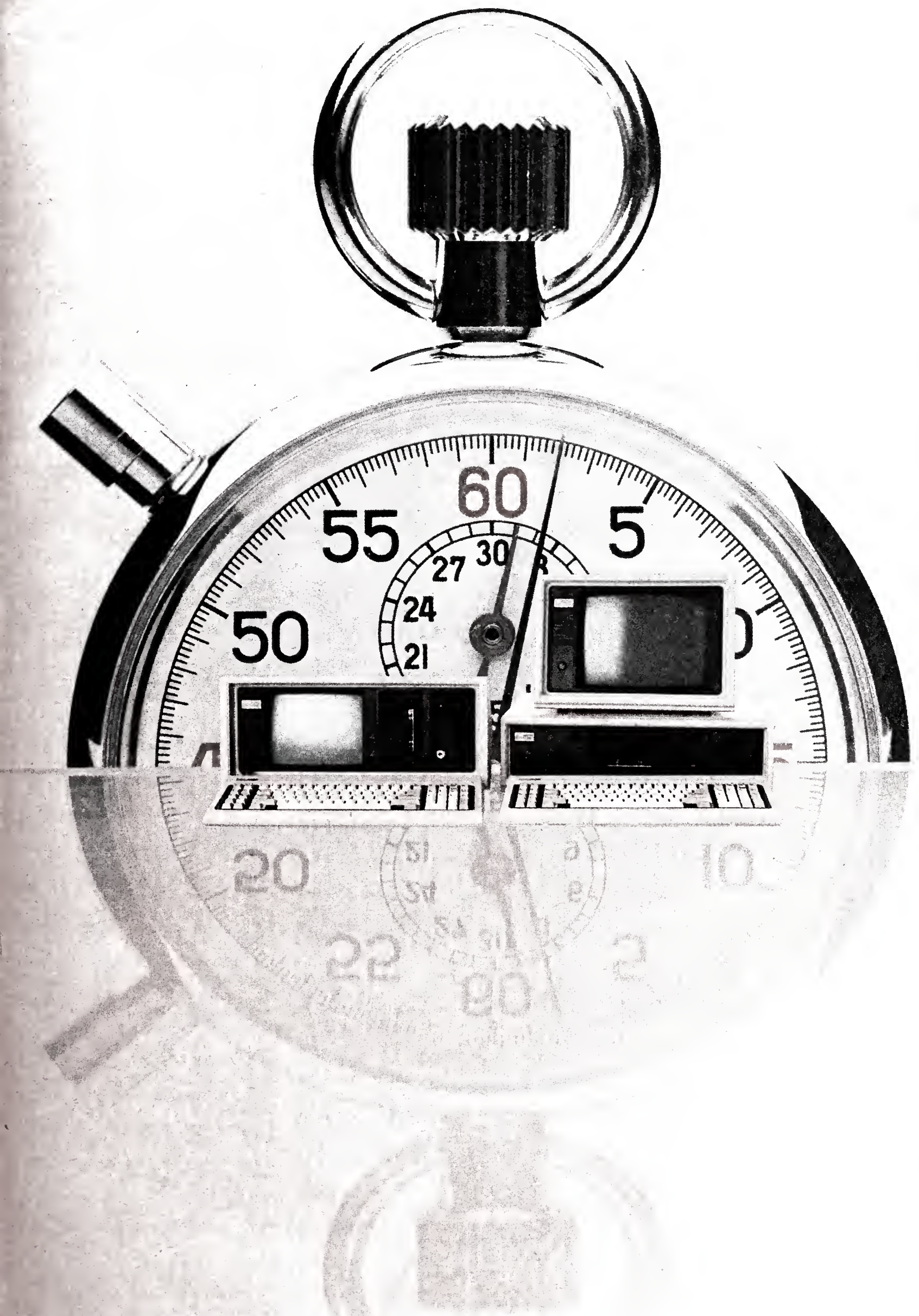

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Continued from page 112

year 2000. It calculates the difference for any two dates between Jan. 1, 0001 and Dec. 31, 9999 or generates a date by adding or subtracting a number of days to another date.

The program is priced at $99 for the first license and $30 for each additional license up to 30.

Viktor Programming and Consulting, P.O. Box 60, Goffstown, N.H. 03045.

■

International Business Information Systems, Inc. has announced **Opus**, an on-line program usage statistics display program for IBM CICS on the IBM 370, 4300, 3030 and 3080 series.

Intended for the DOS/VSE operating system, Opus provides the following options for individual selection criteria: ranking of the 100 most used programs, current residency status, program type, programs supplied by IBM and an accumulative sum of program size or number of fetches.

Opus is priced at $100.

International Business Information Systems, P.O. Box 15780, 828 Royal St., New Orleans, La. 70175.

■

Sotas, Inc. has introduced **Trademark Manager**, a software package developed for optimum control of legal trademark data.

The Trademark Manager was designed to meet the needs of legal departments. It automatically records the scheduling of future events such as renewal. It features multilevel security, free-form text, computer-generated correspondence and multiple-site recording.

The system runs on the Wang Laboratories, Inc. VS series and is priced at $25,000.

Sotas, 192 Merrimack St., Haverhill, Mass. 01830.

■

Alpha Beta Associates, Inc. has announced **Alpha Beta Project Management**, an automated project manager for IBM System/34 and 36 computers.

The interactive set of programs allows users to enter up to 999 projects, each containing a maximum of 999 steps. Weekly reports and Gantt charts by employee and department can also be produced.

The project manager also lets users accumulate labor and expense costs; schedule projects by priority, start and end dates; enter up to 15 holidays; and record a maximum of 20 vacation periods per employee.

A one-time license costs $500.

Alpha Beta Associates, 11 Wildwood St., Winchester, Mass. 01890.

■

Tom Software, Inc. has released **Speed II Commercial Applications** and **Speed II Corporate Applications**, two integrated information management packages for the Wang Laboratories, Inc. VS series.

The applications are written in the vendor's Speed II fourth-generation language and data base management system. Speed II Commercial Applications addresses business management requirements, while Speed II Corporate Applications adds functions to handle multinational corporate environment needs.

Both packages offer general ledger, accounts payable, accounts receivable, inventory control, commission accounting, purchase order control, order entry, fixed assets, sales analysis and payroll.

Pricing for the Speed II products begins at $5,000.

Tom Software, P.O. Box 66596, 127 S.W. 156th, Seattle, Wash. 98166.

■

Omtool Corp. has unveiled **MCBA Micro Level I** accounting, distribution and manufacturing packages for the NCR Corp. Tower and Tower XP supermicrocomputers.

The NCR Tower is a Motorola, Inc. 68000-based multiuser computer. The Tower XP is built around the Motorola 68010. Both run Unisoft System Corp.'s version of AT&T Unix System V operating system.

Prices of MCBA packages for NCR Tower systems range from $1,500 to $2,250. An Omtool Softbol development system for the NCR Tower costs $1,105, and a single Softbol runtime system sells for $720.

Omtool, P.O. Box 477, Tewksbury, Mass. 01876.

■

Pacific Decision Sciences Corp. is offering **Super Service**, a customer service package and inventory control software for IBM mainframes running Cullinet Software, Inc.'s IDMS data base.

The customer service system is designed for direct and third-party service organizations. It provides call handling, service dispatching, engineering and reliability reporting, billing, invoicing, service contract management, equipment configuration control, spare parts management, inventory tracking and control plus financial management functions.

The Total Order Processing and Inventory Control System (TOPICS) can be programmed under Cullinet's ADS/On-Line fourth-generation language. Functions include parts ordering, warehouse management, physical inventory, inventory planning and forecasting, returned parts tracking and spare parts inventory.

Prices range from $10,000 to $150,000 for Super Service and from $90,000 to $150,000 for TOPICS.

Pacific Decision Sciences, Suite 360, 5757 Wilshire Blvd., Los Angeles, Calif. 90036.

■

W. R. Lewis Associates has upgraded its **PCprint** package for the IBM System/34, 36 and 38 to support IBM's enhanced emulation board.

PCprint runs concurrently with the IBM 5250 emulation program to print host system reports on the IBM Personal Computer printer. When used with the enhanced emulation board, PCprint does not require a device description to be configured on the host system.

The package uses the Application Programming Interface capabilities of the 5250 emulation program to accomplish the pass-through and does not require the virtual disk feature.

Prices are $375 for the System/34 and 36 version and $475 for the System/38 version.

W. R. Lewis Associates, 3009 Glenvalley, Midwest City, Okla. 73110.

Data base management systems

National Information Systems, Inc. has announced utilities for its **Accent R** fourth-generation language and relational data base management system.

The Equate utility allows users to extend the Accent R language. The Flatten and Rebuild utilities aid in large-scale modifications of Accent R applications. Flatten converts a data base library into an ASCII text file, and Rebuild converts the file back.

The Migrate utility allows users to transfer Accent R applications between the Digital Equipment Corp. Desystem-10, Decsystem-20 and VAX. The menu and Help utilities have been enhanced.

Accent R is available for the DEC VAX line. Prices range from $12,000 to $40,000, depending on the CPU.

National Information Systems, Suite 130, 20370 Town Center Lane, Cupertino, Calif. 95014.

Remote computing services

ITT Dialcom, Inc., part of the ITT Communications Services Group, has announced that users of its electronic mail network can now access **Advanceline** services for daily information concerning legal, legislative and regulatory developments in the areas of business, finance, taxation, labor and securities.

The services available through Advanceline are Daily Washington Advance, Daily Labor Advance, Daily Congressional and Presidential Calendar, Daily SEC Advance, Daily Tax Advance, Private Letter Rulings and Securities Law Advance.

Advanceline rates are $1.14/min. weekdays from 8 a.m. to 9 p.m. and $1.02/min. the rest of the time.

ITT Dialcom, 100 Plaza Drive, Secaucus, N.J. 07096.

Training

McGraw-Hill Training Systems has released **Version 3.3** of its **McGraw-Hill Interactive Authoring System**.

The system allows users to build courses that combine computer-based materials and interactive video to make self-paced instruction.

System requirements are an IBM Personal Computer with a minimum of 256K bytes of memory and two double-sided disk drives or an IBM Personal Computer XT with a minimum of 256K bytes of memory and one double-sided disk drive. A color graphics card and a serial port are required. A mouse is recommended.

Version 3.3 is priced at $1,395.

McGraw-Hill Training Systems, 4th Floor, 1221 Avenue of the Americas, New York, N.Y. 10020.

■

DGC, Inc. has announced two educational products for the IBM Systems/34, 36 and 38, the **System/34 and 36 Standards and Practices** text and the **System/38 Standards and Practices** video seminar.

Both products cover design standards, programming standards, implementation standards, operations standards, security and integrity standards, purchased software standards and personal computer/remote communications standards.

The System/38 Standards and Practices is available in VHS format for $495. The System/34 and 36 Standards and Practices costs $99.

DGC, 1450 Preston Forest Sq., Dallas, Texas 75230.

MICROCOMPUTERS

Software

Intex Solutions, Inc. has released **X-Y-Z:Query**, a companion product for Lotus Development Corp.'s 1-2-3.

X-Y-Z:Query allows search and data retrieval from as many as 1,000 Lotus 1-2-3 or Symphony spreadsheets.

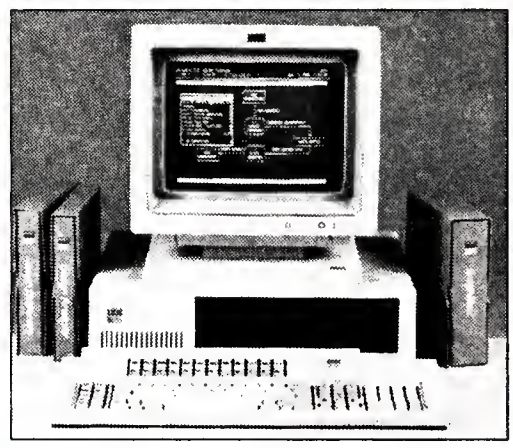
The retrieved data can be used in output formats such as screen or printed reports, new work sheet files and quick statistics and rankings.

X-Y-Z:Query is compatible with Lotus 1-2-3, Symphony 1-2-3 Report and with Intex Solutions' X-Y-Z:Consolidate. It runs on IBM Personal Computers and compatibles, the vendor said.

The price is $195 for up to 12 work sheets and $395 for up to 1,000 work sheets.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

■



Nastec Corp.'s Designaid 3.2

Nastec Corp. has announced an enhancement to its Designaid tool kit for structured analysis, design and software development called **Designaid 3.2** and added two new products, **Safespan** and **Jadesign**, to its Case 2000 series.

Designaid 3.2 has data flow diagram balancing, a provision for structures and a local-area network environment. The local-area network option is called Designaid/LAN.

Safespan provides a bridge between Designaid and Problem Statement Language/Problem Statement Analyzer. Jadesign provides mechanized support for IBM Joint Application Design methodology.

System requirements for Designaid are an IBM Personal Computer XT, AT or 3270 Personal Computer or the Convergent Technologies, Inc. IWS workstation. Both Safespan and Jadesign require Designaid.

Both Designaid 3.2 and Designaid/LAN cost $6,900. There is no charge to current Designaid 2 users. Safespan costs $1,700 and Jadesign $5,000.

Nastec, 24681 Northwestern Highway, Southfield, Mich. 48075.

■

Compufirm Corp. will introduce at Comdex/Fall '85 its **PL/M Connection**, a library of more than 150 functions providing an interface between an IBM Personal Computer and Intel Corp.'s PL/M compiler.

Continued on page 116

It's not just that the COMPAQ Portable is the best-selling portable computer in the world...

It's why.

The COMPAQ® Portable Personal Computer was destined to become a classic. It does more than most desktops because of some farsighted engineering.

We knew that companies would want computers that could keep up with changing technology, so we created a modular portable with a design so innovative it's been patented. It's completely compatible with industry standards. And it has enough memory and expansion slots to accommodate networking, a modem, or a mouse.

Our portables will also accommodate a parallel printer, color and composite monitors, even an RF modulator. All are standard interfaces; you don't have to give up an expansion slot to get them.

Many people prefer COMPAQ Portables to desktop computers because of their small footprint. Plus, because they're portable, they're ideal to share.

What's more, our monitors display high-resolution text *and* graphics, and rugged shock mounting protects stored data. Point being—this is one portable computer with no compromises.

For more information or the names of Authorized COMPAQ Dealers who can set up a hands-on evaluation, call 1-800-543-1300. Ask for Operator 270.

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COMPAQ®

It simply works better.

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 114

The set of system interface routines enables software developers to write applications in the PL/M language on an IBM Personal Computer or compatible by using Intel's operating system-independent PL/M compiler. Developers can access all of a microcomputer's DOS, BIOS and graphics functions. The package includes development support for software control of peripherals.

The PL/M Connection is available for a license fee of $295 per user system.

Compufirm, Suite 204, 7677 Ronson Road, San Diego, Calif. 92111.

■

Cway Software, Inc. will announce two functional management software packages, **Cway Strategy** and **Cway People**, at the Comdex/Fall '85 show.

Cway Strategy was designed to provide a blueprint for planning company or departmental growth. It uses menu-driven commands and on-screen instructions.

Cway People was designed to aid in all aspects of employee management, including interviewing, applicant selection and employee appraisals. It maintains applicant, employee and job files.

Both Cway Strategy and Cway People cost $399 for IBM PC-DOS versions and $499 for the Microsoft Corp. Xenix version.

Cway Software, 121 W. DeKalb Pike, King of Prussia, Pa. 19406.

■

Versasoft Corp. will announce at Comdex/Fall '85 its **Dbman-Net**, a version of its Dbman, the Ashton-Tate Dbase-compatible relational data base management system, designed to run on the Novell, Inc. Netware/86 local-area network.

Dbman-Net is a Dbase-compatible multiuser data base manager for local-area networking. It features record, file and semaphore locking. It can convert single-user Dbase programs to mulituser programs. It provides control over error trapping and recovery, and full print server support is built in.

Dbman-Net runs on Novell Netware Version 4.6 and the IBM Personal Computer, Personal Computer XT, AT, Portable Personal Computer and compatibles. It costs $1,100.

Versasoft, 723 Seawood Way, San Jose, Calif. 95120.

■

Mega Cadd, Inc. will announce its enhanced **Design Board Link** translator software and its enhanced **Design Board Professional** three-dimensional design software at Comdex/Fall '85.

Design Board Link transfers drawings created with the Design Board Professional's 3-D data base to two-dimensional drafting packages from other personal computer computer-aided design and drafting vendors. This allows one data base to serve the design-draft cycle without duplication.

Design Board Link costs $295; Design Board Professional is priced at $1,750.

Mega Cadd, Fifth Floor, The Court in the Square, 401 Second Ave. S., Seattle, Wash. 98104.

Information Processing, Inc. will release at Comdex/Fall '85 its **PC-Blis**, a micro version of its Blis/Cobol multiuser operating system.

PC-Blis operates on the IBM Personal Computer XT and compatibles. It comes with a PC-Blis board that plugs into a spare slot in the personal computer, enhancing the multiuser throughput of the system and enabling Blis/Cobol to run concurrently with IBM's PC-DOS.

A Blis-to-Blis communications option allows the personal computer to communicate with either another personal computer or with a Blis/Cobol minicomputer.

PC-Blis costs $2,190 for a one-user system and $190 for each additional user. A Turbo VM option providing additional throughput costs $180, and the communications option costs $230.

Information Processing, 401 Whooping Loop, Altamonte Springs, Fla. 32701.

■

Allied Computer Group, Inc. has released **DOS Partner**, a file management utility program.

DOS Partner allows users to flag files individually or in groups for easy copying and deletion, to view files forward and backward one page at a time and to hide and protect files using the attributes option.

System requirements are an IBM Personal Computer or true compatible with 128K bytes of random-access memory and two disk drives or one disk drive and one hard disk drive.

DOS Partner costs $39.95.

Allied Computer Group, Software Development Department P, 432 E. Wells St., Milwaukee, Wis. 53202.

■

Rexon Business Machines Corp. is introducing software and hardware enhancements, **System V**, **Recap 5.1** and **PC Harmony**, to its family of multiuser business computers at Comdex/Fall '85.

The Rexon System V that uses Microsoft Corp. Xenix now has configurations supporting up to 16 users from a single console; Recap 5.1, offering two-level program security, will be released; and PC Harmony, a data link and terminal emulation system enabling the integration of IBM Personal Computers into the Rexon system, will also be introduced.

Prices are $695 for PC Harmony, $495 for Recap 5.1 and $995 for the full development system for the System V Xenix machines. The runtime-only version costs $495.

Rexon Business Machines, 5800 Uplander Way, Culver City, Calif. 90230.

■

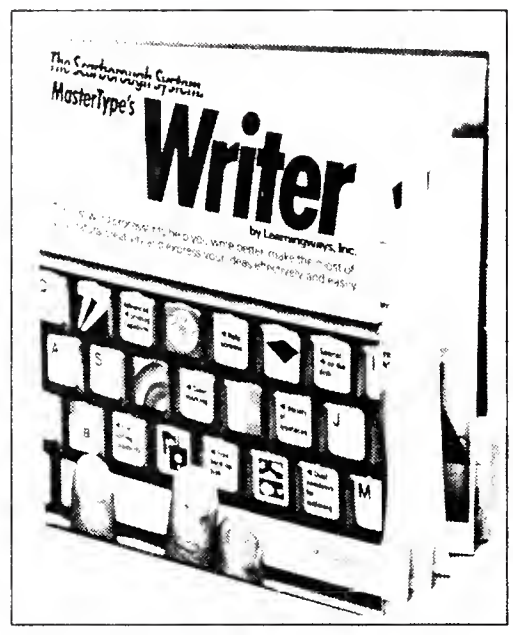
Fox Research, Inc. has introduced **10-Base**, an implementation of IBM's SQL for personal computers.

According to the vendor, 10-Base offers the relational data base management system programming language to users of IBM Personal Computers, Personal Computer XTs, ATs and compatibles running Microsoft Corp. MS-DOS or IBM PC-DOS 2 or higher, 320K bytes of random-access memory and two disk drives. The menu-driven program offers easy access to data base operations plus extensive Help. It supports multiple simultaneous users, file sharing and record locking.

The cost of 10-Base is $895.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

■



Mastertype's Writer

Scarborough Systems, Inc. has announced **Mastertype's Writer**, a word processing system for the Apple Computer, Inc. Apple II family and the Commodore Business Machines, Inc. 64 and 128 computers.

Mastertype's Writer offers dual windows for outlining, color highlighting, multiple typefaces, macro commands and an on-disk tutorial. It has sorting capabilities and can print out linked files.

Mastertype's Writer costs $69.95 for the Apple II computers and $44.95 for the Commodore systems.

Scarborough Systems, 55 S. Broadway, Tarrytown, N.Y. 10591.

■

Computer Associates International, Inc. has added **Job Costing** to its Easybusiness series of software poducts and will introduce it at Comdex/Fall '85.

Job Costing allows users to break jobs into as many cost components as needed. Estimated and actual costs can be maintained by job, phase or category.

Job Costing runs under Easyplus, Computer Associates' windowing system. It is available for the IBM Personal Computer, Personal Computer XT, AT, 3270 and compatibles. It requires 128K bytes of random-access memory (RAM). With Easyplus, 256K bytes of RAM and a hard disk are required.

The cost is $595.

Computer Associates, 2195 Fortune Drive, San Jose, Calif. 95131.

■

Software Solutions, Inc. has announced **Voila**, a user-oriented menu of programs for the IBM Personal Computer.

Voila lists programs in English for direct loading. It allows the user to edit the listing, set colors and write batch files.

Voila runs on the IBM Personal Computer, Personal Computer XT, AT or true compatibles running under IBM PC-DOS or Microsoft Corp. MS-DOS Version 2 or higher. It will load and execute all DOS applications, according to the vendor.

Voila costs $29.95.

Software Solutions, 301 W. Harris St., Eureka, Calif. 95501.

Omation, Inc. has announced **Schema**, a computer-aided engineering schematic capture program for the IBM Personal Computer, Personal Computer XT or AT.

Schema consists of a drawing editor with a mouse-driven user interface, object libraries containing more than 1,000 objects and five postprocessors.

The postprocessors automatically extract net lists, wire lists and bills of materials from schematic drawings while verifying circuit integrity with routing, design rule check and usage reporting.

Schema costs $495.

Omation, Suite 809, 1701 N. Greenville Ave., Richardson, Texas 75081.

■

Visible Systems Corp. has introduced its IBM Personal Computer-based **Analyst Workbench** modular software productivity tool.

The Analyst Workbench includes three parts. Tool A is the Visible Analyst, which creates diagrams and documents. Tool B is the Visible Rules, which is used for analyzing diagrams; and Tool C is the Visible Dictionary, which stores and organizes data in a central depository.

The Analyst Workbench runs on an IBM Personal Computer XT, AT or 3270 Personal Computer. It requires 384K bytes of random-access memory, one floppy disk drive and one hard disk drive, a Microsoft Corp. mouse and an IBM color monitor.

Each tool costs $595. In mixed quantities of 100, the price is $400 each.

Visible Systems, 336 Baker Ave., Concord, Mass. 01742.

■

VM Personal Computing, Inc. has announced the **Relay Gold Customizer's Toolbox** for users of its Relay Gold concurrent personal computer communications software.

Customizer's Toolbox was designed to give applications developers the flexibility to change completely Relay Gold's user interface by creating menus or altering any of the standard menus to fit specific needs.

The Relay Gold Toolbox will be available in January for $500.

VM Personal Computing, 6 Germantown Road, Danbury, Conn. 06810.

■

P-Cube Corp. has announced its **Priorities/IRM**, a software product that compares the current status of information services support at any level of an organization against well-defined benchmarks and enables an organization to identify where changes in support offer the maximum return from investments in information resources.

The package incorporates a set of factors for profiling information services support. Each factor reflects a specific aspect of support and has associated with it a measurement scale that shows varying levels of support identified in a variety of industries.

System requirements are an IBM Personal Computer or compatible with at least 512K bytes of random-access memory. The price is $1,800, including training and on-site consulting.

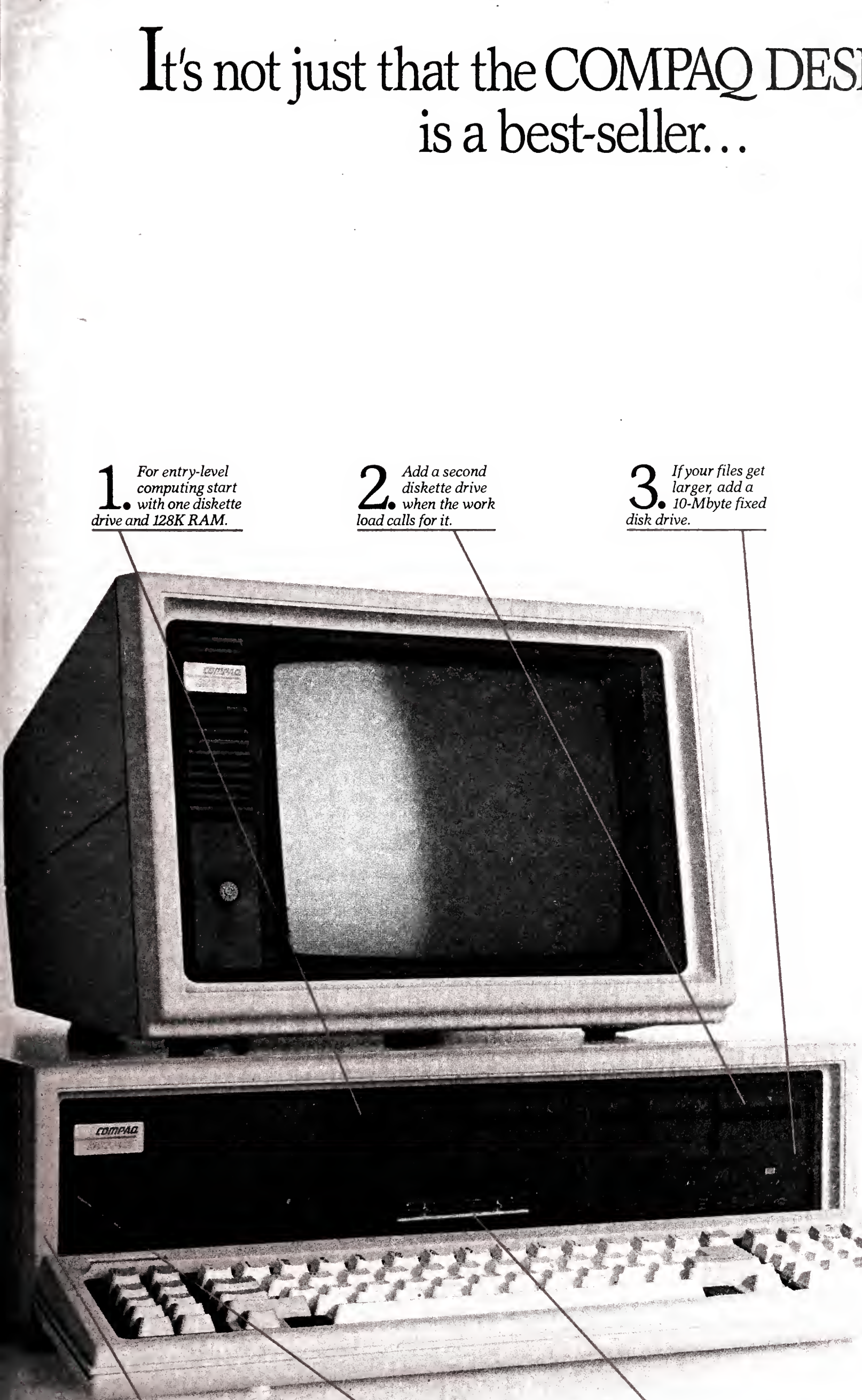
P-Cube, 915 Kings Canyon Road, Brea, Calif. 92621.

It's not just that the COMPAQ DESKPRO is a best-seller...

1. *For entry-level computing start with one diskette drive and 128K RAM.*

2. *Add a second diskette drive when the work load calls for it.*

3. *If your files get larger, add a 10-Mbyte fixed disk drive.*



4. *Getting new memory-hungry software? Upgrade to 640K RAM.*

5. *Monster spreadsheets are no problem. Add an 8087-2 co-processor.*

6. *Protect reams of data on a pocket-sized tape cartridge by adding a tape back-up.*

It's why.

In four months the COMPAQ DESKPRO® became the world's second-best-selling 16-bit personal business computer. Today it's a proven performer that satisfies the most critical computer users.

The modular COMPAQ DESKPRO expands from entry level to advanced computing, with up to 30 Megabytes of fixed disk storage. Select the exact features you need, including tape back-up. In fact, you can have up to four *internal* storage devices (the IBM® PC or IBM PC/XT™ can have only two).

Interfaces for a parallel printer, RGB color and video composite monitors, and RF modulator are built in. So you don't use up expansion slots for them. On other computers you probably would.

You also get uncompromising compatibility with the most popular peripherals and with thousands of the most popular business programs. And the COMPAQ DESKPRO runs programs two to three times *faster* than either the IBM PC or IBM PC/XT.

The COMPAQ DESKPRO even comes with a better monitor. You get high-resolution text *and* graphics on one screen, saving the cost of a second monitor.

The COMPAQ DESKPRO continues to be a best-seller because it simply works better.

For more information or the names of Authorized COMPAQ Dealers who can set up a hands-on evaluation, call 1-800-543-1300. Ask for Operator 270.

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COMPAQ®

It simply works better.

Software Studios, Inc. has released Version 6 of its **PC-Desk III** desktop management program.

New features include file encryption decryption, file merge, full screen data entry and editing, the addition of color and the addition of Turboscreen, a screen display function.

PC-Desk III, Version 6 is designed for the IBM Personal Computer, Personal Computer XT, AT and compatibles with a minimum of 272K bytes of random-access memory.

It is priced at $49, plus $2 for shipping. Upgrades for PC-Desk or PC-Desk II cost $25. Updates from the earlier version of PC-Desk III are free.

Software Studios, 8516 Sugarbush, Annandale, Va. 22003.

■

Heuristic Computer Systems has announced a new version of its HCS/Editor, **HCS/E 10-26-85**.

HCS/E is a full screen editor similar to the IBM TSO/SPF mainframe editor. Enhancements reportedly include split screen, support for 254 char. lines, faster execution, displays of the amount of storage available and DOS commands allowed from any HCS/E screen.

HCS/E operates on all IBM PC-DOS- and Microsoft Corp. MS-DOS-type machines with 192K bytes of memory and one floppy drive, including IBM Personal Computers, Personal Computer XTs and ATs.

HCS/E costs $49.95 plus $5 for shipping and handling. Updates cost $8 plus $3.50 for shipping and handling. Current users with Version 8-22-85 or later can upgrade free of charge.

Heuristic Computer Systems, 853 Hickory Drive, Carmel, Ind. 46032.

■

Galileo Scientific, Inc. has released **E-Z Graph II**, a version of its autographing subprogram, and **FIT**, a regression analysis subprogram, for the Hewlett-Packard Co. HP 9000 Series 200 desktop computers.

E-Z Graph II gives graphing capabilities to programs. In addition to its default mode with autoscaling/offset, new features include movable labels with keyboard-controllable size and orientation and nondefault options, which allow more than 100 plotting variations for custom-tailored graphs.

FIT provides linear and general nonlinear regression analysis with any number of independent variables and adjustable parameters. It provides a tabular output of all input data and regression results for easy fitting of equations to data. When used with E-Z Graph II, it gives a graphical display of the fitting analysis.

The programs require HP Basic 2 with Ap2 and 45K bytes of random-access memory. E-Z Graph II costs $125, and FIT costs $70.

Galileo Scientific, 20312 Aspenwood Lane, Gaithersburg, Md. 20879.

■

Pacific Bond Research has announced **Yldex**, a program for calculation and analysis of fixed-income securities.

Yldex supports investment activities such as investment analysis, trading, accounting and performance evaluation. It provides quoted true and after-tax yields, pretax and after-tax durations, principal, accrued interest and totals, straight-line and constant-yield amortization and profit and loss accounting. Analysis includes scenario analysis, sensitivity analysis, break-even analysis, horizon analysis and peformance analysis.

Yldex runs on all IBM and compatible microcomputers with 192K bytes of memory. It is priced at $100.

Pacific Bond Research, #1, 520 Clayton St., San Francisco, Calif. 94117.

■

Unisource Software Corp. has ported Ryan-McFarland Corp.'s **RM/Cobol** to the Venturcom, Inc. Venix/86 operating system on personal computers.

RM/Cobol can be used to create application software. It is particularly suited to the development of vertical business appplications.

Venix/86 is an implementation of AT&T's Unix for the IBM Personal Computer, Personal Computer XT, AT and compatibles; the AT&T PC-6300 and Digital Equipment Corp. personal computers.

A complete RM/Cobol development system is available for $1,250, and runtime versions sell for $250 each.

Unisource Software, 71 Bent St., Cambridge, Mass. 02141.

■

Data-Basics, Inc. has introduced a **multiterminal option (MTO)** for its Architectural Engineering Master Accounting System software package.

MTO uses the Microsoft Corp. Xenix-286 operating system on microcomputers including the IBM Personal Computer AT, the Compaq Computer Corp. 286 series and the Sperry Corp. PC/IT, allowing the microcomputers to support multiple terminals. The Sperry PC/IT will support up to nine terminals, and the IBM and Compaq computers will support up to three terminals.

The MTO option costs $2,500.

Data-Basics, 11000 Cedar Road, Cleveland, Ohio 44106.

■

Aton International, Inc. has introduced **Micro/Remote 3270 Emulator**.

Micro/Remote 3270 emulates the IBM 3275 bisynchronous interactive terminal protocol for use with both DOS and dedicated system applications. Users can access an IBM mainframe from an IBM Personal Computer, Personal Computer XT or AT and perform local processing as well.

Features include single or multiport nonswitched communications line protocol, support of ASCII or EBCDIC transmission codes, print key dump to a list device, line monitor routines for on-screen display of communication line sequences, easy adaptation for 3274/3276 cluster emulation and the ability to configure the software to use separate ASCII CRTs instead of a personal computer screen and keyboard.

The source code is priced at $9,500. A binary executable copy of the product and user documentation is available for $95.

Aton International, Suite 119, 1765 Scott Blvd., Santa Clara, Calif. 95050.

■

Micro Support Resource Corp. has announced **Magic Answer Extractor (MAX)**, a computer programmed to answer questions about personal computer software available to personal computer users via a toll-free telephone hot line.

Personal computer users with a Micro Support Resource support contract can call the company toll free to question MAX. MAX Supports Lotus 1-2-3 and Symphony from Lotus Development Corp.; R-Base 5000 from Microrim, Inc.; Microsoft Corp. Word; IBM Displaywriter 3; Wordstar 2000 from Micropro International Corp.; Multimate, from Multimate International Corp.; Word Perfect from Satellite Software and Samna+ and Samna Word from Samna Corp.

The price of an annual Micro Support Resource support contract is based on the number of software packages in use. A single-user contract for support of Lotus 1-2-3 is priced at $104.

Micro Support Resource, Suite 150, 3355 Northeast Expwy., Atlanta, Ga. 30341.

■

Lifeboat Associates, Inc. has unwrapped three program development packages for Digital Equipment Corp. VAX computers running IBM VMS or AT&T Unix and Motorola, Inc. MC68000 running Unix and Microsoft Corp. MS-DOS: **Lattice C**, a C cross compiler; **Fortrix-C**, a Fortran-to-C converter; and **Emacs**, a text editor.

Lattice C cross compilers let users develop software for microcomputers by writing code on minicomputers and then recompiling. Each cross compiler offers the same functionality and generates the same code as native Intel Corp. 8086/8088 compilers and can use native Lattice 8086/8088 support libraries.

Fortrix-C converts Fortran programs and code to C. It can be used with the Lattice C cross compiler to convert programs to C and download to the microcomputer environment.

The full screen text editor, Emacs, lets users edit several files at once by dividing the screen into multiple windows. Users can also create macros and write their own editor commands using a built-in compiled MLisp programming language.

List prices are $500 for the C cross compiler and $375 for Emacs. Fortrix-C is priced from $995.

Lifeboat Associates, 1651 Third Ave., New York, N.Y. 10128.

■

RM/Cobol-8X, a Cobol compiler for microcomputers that includes IBM mainframe Cobol extensions and structured programming features from the ANSI X3.23 198X Cobol standards proposal has bowed from **Ryan-McFarland Corp.**

Designed for the IBM Personal Computer family, the RM/Cobol-8X compiler provides portable applications code. To enable smaller systems to handle mainframe applications, the compiler eliminated the 64K-byte program size restrictions usually associated with IBM PC-DOS or Microsoft Corp. MS-DOS Cobol programs.

The compiler also provides an RM/Cobol Version 2 compatibility switch, which ignores new language features like the ANSI 85 extensions to eliminate syntax conflicts between RM/Cobol Version 2 applications and the ANSI 85 standard.

RM/Cobol-8X development systems list for $1,250; runtime versions sell for $300.

Ryan-McFarland, 609 Deep Valley Drive, Rolling Hills Estates, Calif. 90274.

■

The Finot Group has upgraded its Keeptrack hard-disk utility software for the IBM Personal Computer, Personal Computer XT, AT and compatibles. **Keeptrack Release 1.1** features backup and restore and branch operations.

The backup and restore function provides procedures for moving all or selected files from a hard disk to floppy disks. Keeptrack offers a choice of backing up the entire disk, backing up selected files or partial backup — which usually consists of anything new since the last backup.

Branch operations allow users to copy, move, delete or perform other functions on an entire subdirectory or on a directory and its subdirectories via function key commands.

Keeptrack 1.1 costs $79.

The Finot Group, Suite 3, 2390 El Camino Real, Palo Alto, Calif. 94306.

■

Beaman Porter, Inc. has introduced **Release 2.2** of the **Powertext Formatter,** a text formatter for any word processor running Microsoft Corp.'s MS-DOS that generates ASCII files.

Release 2.2 lets users format in two or more newspaper-style columns; write multiple synchronized columns for audio/video scripts or columnar reports; automatically footnote in several styles at the bottom of a page or end of a document; automatically outline up to nine levels deep; and outline within columns or according to military specification requirements.

Other enhancements in this release are an ability to number paragraphs for contracts, legal documents and technical manuals; proportional printing; calendar and screenplay formatting; and mail merge.

The Powertext Formatter is priced at $49.95.

Beaman Porter, 417 Halstead Ave., Harrison, N.Y. 10528.

Systems

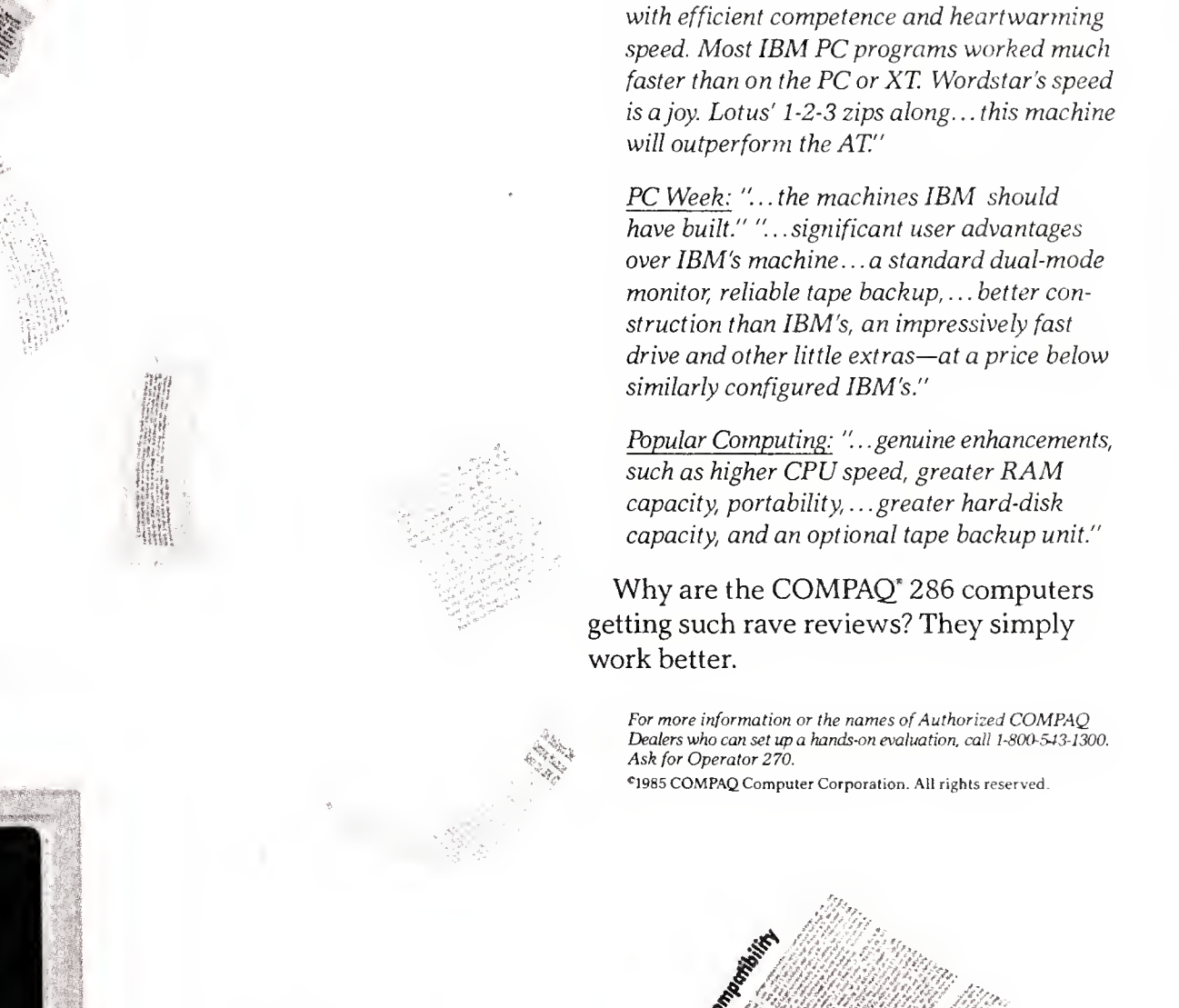
Duxbury Systems, Inc. has introduced its **Braille Production System (BPS)**.

BPS is an integrated system that produces braille from typewritten copy with just four keystrokes. The system includes an IBM-compatible personal computer, the Duxbury Braille Translator, a voice device such as Digital Equipment Corp.'s Dectalk, a personal or high-production braille printer and an optical character reader.

A basic Braille Workstation consisting of a personal computer, Braille Translator and a complete software package for communications, word processing and screen management is available for the price of $4,995.

Duxbury Systems, P.O. Box 1504, 435 King St., Littleton, Mass. 01460.

It's not just that COMPAQ 286 Computers are getting rave reviews...



It's why.

Since we introduced the COMPAQ DESKPRO 286™ and COMPAQ PORTABLE 286™ the accolades haven't stopped:

InfoWorld: "(COMPAQ DESKPRO 286 is) a superb performer. It races through its tasks with efficient competence and heartwarming speed. Most IBM PC programs worked much faster than on the PC or XT. Wordstar's speed is a joy. Lotus' 1-2-3 zips along... this machine will outperform the AT."

PC Week: "...the machines IBM should have built." "...significant user advantages over IBM's machine... a standard dual-mode monitor, reliable tape backup,... better construction than IBM's, an impressively fast drive and other little extras—at a price below similarly configured IBM's."

Popular Computing: "...genuine enhancements, such as higher CPU speed, greater RAM capacity, portability,... greater hard-disk capacity, and an optional tape backup unit."

Why are the COMPAQ® 286 computers getting such rave reviews? They simply work better.

For more information or the names of Authorized COMPAQ Dealers who can set up a hands-on evaluation, call 1-800-543-1300. Ask for Operator 270.

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COMPAQ®

It simply works better.

NEW PRODUCTS/MICROCOMPUTERS

Omni Computer Systems, Inc. has announced **Flash+4**, an integrated mail system.

Flash+4 is used to simplify mass mailing and to organize mailings. For instance, it is used to update address files with five-digit ZIP codes to nine-digit codes.

Flash+4 is a turnkey system consisting of an IBM Personal Computer XT with either a 10M- or a 20M-byte hard disk, a control card, a modem and a laser disk reader. Software components include ZIP+4 conversion routines, Flash-Com electronic mail software, Flash+4 smart formatting routines and laser-key data retrieval software. The ZIP+4 and other data bases reside on the laser disk.

Flash+4 is priced at $25,000. There is a yearly support service available for $2,000 a year.

Omni Computer Systems, P.O. Box 162, Chestnut Hill, Mass. 02167.

■

ISI International Corp. has added the **ISI 6170 Industrial Computer** to its line of ruggedized IBM Personal Computer and Personal Computer AT-compatible systems.

The 6170 is a rack-mountable computer that is hardware and software compatible with the IBM Personal Computer AT. It also provides compatibility with IBM's 7532 Industrial Computer. The 6170 uses Intel Corp.'s 8-MHz 80286 processor and optional 80287 math coprocessor. It has 12 dual-connector expansion slots.

Single-quantity pricing for a 6170 with 512K bytes of memory, a 1.2M-byte disk drive and a keyboard is $4,000.

ISI International, 1275 Hammerwood Ave., Sunnyvale, Calif. 94089.

■

Sextant 815, a graphics display system for IBM Personal Computer-based computer-aided design software, has debuted from **TAT Graphics Group, Inc.**

Sextant 815 provides noninterlaced 800- by 600-pixel flicker-free resolution. The system includes a 15-in. color monitor with tilt-and-swivel base, TAT single-board Galaxy graphics controller, red-green-blue cable and initialization software. An optional print feature lets users create 16-col. or 8½- by 11-in. overhead transparencies or prints. A Tektronix, Inc. 4107 color graphics display terminal emulation package, T-Graf-07, is also available as an option.

Sextant 815 sells for $4,395. Option prices are $150 for the print package and $995 for T-Graf-07.

TAT Graphics Group, Building E, 1270 Lawrence Station Road, Sunnyvale, Calif. 94089.

Communications

Matrix Communications, Inc. is set to unveil the **Alliance** series, a system designed to interconnect IBM Personal Computers, at the Comdex/Fall '85 show.

The Alliance series links up to 20 personal computers. It is based on a programmable cluster controller that connnects the computers via RS-232 interfaces at 115K bit/sec.

Pricing for the Alliance series is approximately $100 per node. The eight-port model is priced at $895 with a $349 charge for each additional four-port module.

Matrix Communications, 112-116 Washington St., Marblehead, Mass. 01945.

■

Integrated Network Systems, Inc. is set to introduce its **Gateway** product line consisting of the **SDLC Gateway PC Adapter**, the **8100 Gateway PC Adapter** and the **X.25 Gateway PC Adapter** at the Comdex/Fall '85 show.

The SDLC Adapter connects to any host supporting IBM's Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) 3270 control units via leased or switched lines. Up to 32 personal computers in the network can appear as logical units to the host, each with file transfer capability.

The 8100 Adapter connects to the multiuse communications loop of the IBM 8100 Information System, and the X.25 Adapter allows connection to public or private X.25 networks using switched or permanent virtual circuits to hosts supporting SNA 3270 control units. Both provide file transfer for as many as 32 network-connected personal computers.

All the Gateway PC Adapters feature SNA 3274 cluster controller emulation, on-board microprocessor, local screen capture to printer or disk and the application program interface that enables user-written programs to perform varied operations.

The SDLC and X.25 Gateway PC Adapter are priced at $1,995, and the 8100 Gateway PC Adapter is priced at $2,295.

Integrated Network Systems, P.O. Box 91395, Mobile, Ala. 36691.

■

Fox Research, Inc. has added electronic mail and other utilities to its **10-Net** local-area network.

10-Net electronic mail lets users send files, notes, memoranda and letters to one or more users. The Chat software utility allows users to exchange short messages, and the News utility posts messages and general interest information to every workstation.

10-Net runs on the IBM Personal Computer, Personal Computer XT, AT and compatible systems running Microsoft Corp.'s MS-DOS or IBM's PC-DOS 2 and higher. 10-Net local-area network nodes, including interface card, tap box, 8-ft connecting cable, software and manual, are available for $695 each.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

■

The Software Link, Inc. has announced a **Multilink Advanced** version of its **Btrieve/N** file management system used to develop applications in Basic, Pascal, C, Fortran and APL.

Multilink Advanced allows users to connect up to eight ASCII terminals to a single microcomputer running IBM's PC-DOS 3.2. It is fully compatible with all existing versions of Btrieve and provides automatic file recovery in the event of a systems crash. Single-user Btrieve environments can be moved into a multiuser environment without software changes.

The Multilink Advanced version of Btrieve is priced at $595. Multilink Advanced costs $495.

The Software Link, Suite 632, 8601 Dunwoody Place N.E., Atlanta, Ga. 30338.

■

Gateway Communications, Inc. will announce its **G/Snanet**, a communciations gateway server for its G/Net local-area network.

The package allows IBM Personal Computers, Personal Computer XTs, ATs and compatibles interconnected on G/Net to access mainframe computers through the G/Snanet local-area-network-to-host gateway in an IBM Systems Network Architecture/Synchronous Data Link Control (SDLC) environment.

G/Snanet provides up to 32 concurrent sessions. Each personal computer can use the 3270 protocol or the 3770 RJE protocol. In 3270 mode, G/Snanet emulates an IBM 3274 controller. In 3770 RJE mode, it emulates an IBM 3770 RJE workstation.

The package consists of a personal computer plug-in board plus a software emulation module. The G/Snanet software module with SDLC adapter is priced at $2,495. The G/Snanet software module costs $2,995.

Gateway Communications, 16782 Red Hill Ave., Irvine, Calif. 92714.

Storage

Suitable Solutions has announced **Idrive**, an add-on floppy disk drive for the Digital Equipment Corp. Rainbow personal computer.

Idrive provides IBM Personal Computer and Personal Computer XT compatibility. It is an external 48 track/in. double-sided disk drive that plugs into the back of the Rainbow. It allows IBM-compatible diskettes to be read, written and edited from the Rainbow without reformatting media or transferring files.

Idrive costs $395.

Suitable Solutions, Suite 319, 47 Saratoga Ave., San Jose, Calif. 95129.

■

Priam Corp. has unwrapped **Innerspace IT60**, a tape backup kit for the IBM Personal Computer, Personal Computer XT, AT and compatibles that creates an archival copy to protect data stored on disks from accidental damage or loss.

Designed for use with the vendor's 5¼-in. Innerspace disk drives, the kit operates at 90K bit/sec. and transfers the contents of a 60M-byte disk in less than 15 min.

Innerspace IT60 costs $1,595.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134.

Printers/plotters/peripherals

Okidata Corp. has unwrapped the **Cut Sheet Feeder 900 (CSF900)**, an accessory for single-sheet printing on Microline 192 and 193 dot matrix printers.

CSF900 accepts up to 170 sheets through the input hopper. Users can feed paper manually or automatically through host computer software. Paper ranging from 7.2 in. to 8.5 in. wide and weighing between 16 and 24 lb, plus company letterhead, can be accommodated. A top retention feature allows the top-of-form position to be set from the printer's front panel. This position remains stored in memory even when the printer's power is turned off.

CSF900 sells for $229.

Okidata, 532 Fellowship Road, Mount Laurel, N.J. 08054.

■

Facit, Inc. is set to introduce two IBM-compatible dot matrix printers, the **4513** and the **4514** at the Comdex/Fall '85 show.

Both printers can emulate the IBM/Epson America, Inc. and the Epson/FX protocols, allowing them to interface with computers ranging from IBM Personal Computers to AT&T Unix-based supermicrocomputers. Both offer 10 and 12 char./in. or proportional space printing in the near-letter-quality mode. In draft mode they offer 10, 12 and 17 char./in. and proportional space printing. Both print at 160 char./sec. in draft mode and include a parallel and a serial interface.

The 4513 is priced at $695, and the 4514 costs $845.

Facit, 9 Executive Drive, Merrimack, N.H. 03054.

■

Brother International Corp. has announced its **2024L** letter-quality dot matrix printer.

The 2024L uses a 24-pin staggered arrangement, single-pass print head for 180 dot/in. graphics, letter-quality printing at up to 96 char./sec. and draft printing at 160 char./sec. It provides Centronics Data Computer Corp. parallel or RS-232C interfaces.

The 2024L is priced at $1,295 including a rear-feed tractor. There is an optional 8½-in. paper capacity sheet feeder available for $299 and an optional 15-in. paper capacity sheet feeder for $399.

Brother International, 8 Corporate Place, Piscataway, N.J. 08854.

■

Microvitec's Model 945 CN

Microvitec, Inc. has announced the **Definition** line of color graphics monitors for business graphics and computer-aided design.

The line includes the 900 series and the 940 series. The 900 series includes three 14-in. monitors each with a horizontal scan frequency of 31.5 kHz and a 900- by 640-pixel resolution. The Definition 900-DI and the 901-DI are board compatible with 640- by 400-pixel noninterlaced 25-kHz scan rate boards. The 905-DN is an analog monitor.

The 940 series also includes three monitors each with a horizontal scan frequency of 31.5 kHz normal. The 941-DN has a 14-in. monitor with 900- by 640-pixel resolution. The

Continued on page 122

It's not just that COMPAQ Personal Computers are used in more top companies than Apple, Wang, Tandy, Hewlett-Packard, Digital, AT&T, Data General, NCR, NEC...

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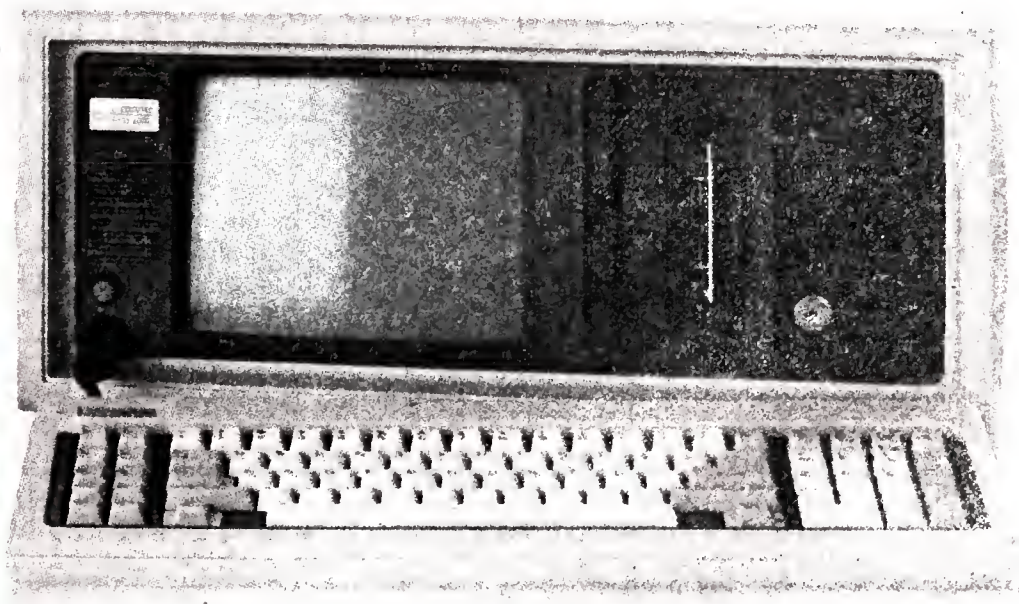
*Source: Newton-Evans Research Co. 1985 survey.



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NEW PRODUCTS/MICROCOMPUTERS

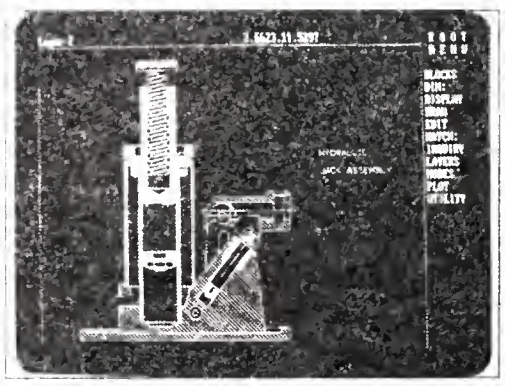
Continued from page 120

940-CN has a 20-in. monitor and 940-by-700-pixel resolution. The Definition 945 CN has a 20-in. monitor and 1,024-by-768-pixel resolution.

Prices are as follows: the 900-DI, $795; the 901-DI, $895; the 905-DN, $995; the 941-DN, $995; the 940-CN, $1,595; and the 945-CN, $1,795.

Microvitec, 1943 Providence Court, Airport Perimeter Business Center, College Park, Ga. 30337.

■



Wyse Technology's WY-700 screen

Wyse Technology, Inc. will introduce the **WY-700**, a high-resolution, 15-in. monochrome monitor and graphics board subsystem for personal computers at the Comdex/Fall '85 show.

The WY-700 provides up to 1,280-by 800-pixel resolution. It runs on the IBM Personal Computer, Personal Computer XT, AT, the Wyse Technology WysePC and other compatible personal computers. The monitor has a bit-mapped graphics board that uses one slot in the personal computer.

The WY-700 is priced at $1,595.

Wyse Technology, 3571 N. First St., San Jose, Calif. 95134.

Board-level devices

Applied Reasoning Corp. has added the **Model 2100** to its PC-Elevator series of processor boards and will introduce it at Comdex/Fall '85.

The Model 2100 is said to accelerate the computational power of an IBM Personal Computer or Personal Computer XT to twice the speed of a Personal Computer AT. It operates in tandem with the Intel Corp. 8088 processor and uses it as an I/O processor for managing all disk and other I/O functions. It incorporates a 10-MHz Intel 80286 processor, and it has an 80287 floating-point coprocessor in both 5- and 8-MHz versions.

The Model 2100 costs $2,695.

Applied Reasoning, 765 Concord Ave., Cambridge, Mass. 02138.

■

Dynatec Systems, Inc. is set to introduce at Comdex/Fall '85 the **PC Supercharger**, a plug-in board that increases the IBM Personal Computer processing speed without using a coprocessor.

The Supercharger installs in the microprocessor socket on the motherboard and does not require an expansion slot.

The board uses either a hardware switch or software commands for speed change selection, according to the vendor.

The PC Supercharger uses a 10-MHz Intel Corp. 8088 microprocessor. Operation is transparent to the user.

The PC Supercharger costs $279.95.

Dynatec Systems, Suite 103, 870 E. 9400 South, Sandy, Utah 84070.

Emulex Corp. has announced the **IB02** host adapter, which connects an IBM Personal Computer to small computer systems interface peripherals.

The IB02 contains a protocol controller that provides the small computer systems interface. The device implements full small computer systems interface protocol and ensures proper performance of the I/O system. The IB02 is packaged on a printed-circuit board that plugs into one of the I/O expansion slots in the IBM Personal Computer, Personal Computer XT or AT backplane.

The IB02 provides integration of 5¼-in. Winchester disk drives and/or ¼-in. cartridge tape drives for expanded storage and backup capabilities. Up to seven controllers can be attached to the IB02, and each controller can suppport up to eight Winchester drives.

The IB02 is priced at $395.

Emulex, P.O. Box 6725, 353 Harbor Blvd., Costa Mesa, Calif. 92626.

■

ABM Computer Systems will announce at the Comdex/Fall '85 show its **X2C** board, a multifunction board for the IBM Personal Computer, Personal Computer XT and compatibles.

The X2C offers up to 2M bytes of random-access memory (RAM), nonvolatile RAM for all memory, automatic software configuration and software that includes a pop-up windowing print spooler, error correction and detection memory.

The board features 256K bytes of RAM, expandable on the main board to 1M byte; printer port; serial port; clock/calendar; and software.

The price is $395.

ABM Computer Systems, 3 Whatney, Irvine, Calif. 92718.

■

Reference Technology, Inc. has announced its **Clasix Multidrive Director** that increases the number of card read-only memory drives attached to a personal computer.

Clasix connects up to eight Reference Technology Clasix Datadrive Series 500 optical disk drives to a single IBM Personal Computer, Personal Computer XT, AT or compatible.

There are two models of the Multidrive Director. The Model MD-504 attaches four Datadrives, and the Model MD-508 attaches the full eight Datadrives.

The MD-504 costs $795, and the MD-508 is priced at $1,000.

Reference Technology, 1832 N. 55th St., Boulder, Colo. 80301.

■

Toshiba America, Inc. has unveiled two 64K-byte CMOS static random-access memories (RAM), the **Model TC5561P** and the **Model TC5562P**.

Model TC5561P offers two speed sorts: 55 nsec and 70 nsec. Operating current is said to be 100 mA.

The TC5562P provides 45-nsec or 55-nsec access times. Operating current is also 100 mA, and standby power is 20 mA, according to Toshiba America.

I/O is transistor-transistor logic compatible on both models, which operate from a single 5V power supply.

Sample quantity prices are $38.50 for the Model TC5561P and $35 for the Model TC5562P.

Toshiba America, 2692 Dow Ave., Tustin, Calif. 92680.

Auxiliary equipment

Kensington Microware Ltd. has announced four accessories: the **Universal System Stand**, the **Universal Tilt/Swivel**, the **Universal Copy Stand** and the **Universal Anti-Static Wrist Rest**.

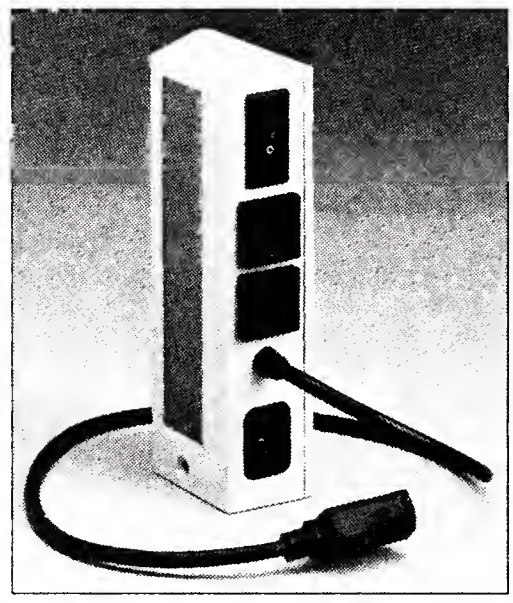
All were designed to work with Kensington's Master Piece for IBM Personal Computers and compatibles, according to the vendor.

The Universal System Stand allows the computer system to sit vertically beside the desk. The Tilt/Swivel fits under any personal computer monitor and accommodates the Master Piece. The Copy Stand attaches directly to the monitor. The Anti-Static Wrist Rest attaches to the keyboard and is covered with a grounded antistatic mat.

Prices for the system stand, the tilt/swivel, the copy stand and the wrist rest are $39.95, $49.95, $44.95 and $49.95, respectively.

Kensington Microware, 251 Park Ave. S., New York, N.Y. 10010.

■



Systems Control's surge suppressor

Systems Control, a division of **M. J. Electric Corp.**, has introduced the **Engarde Surge Suppressor**.

The Engarde protects the microcircuitry and software of personal computers from damage and lost data by clamping off power surges. It features a built-in antistatic touch pad that drains static electricity from the operator's body before the computer is used.

It also attenuates radio frequency interference to keep data from becoming garbled in memory and warns the operator with an LED when the electrical outlet being used is improperly grounded.

Engarde is priced at $67.50.

Systems Control, P.O. Box 788, Iron Mountain, Mich. 49801.

COMMUNICATIONS

Voice/data communications

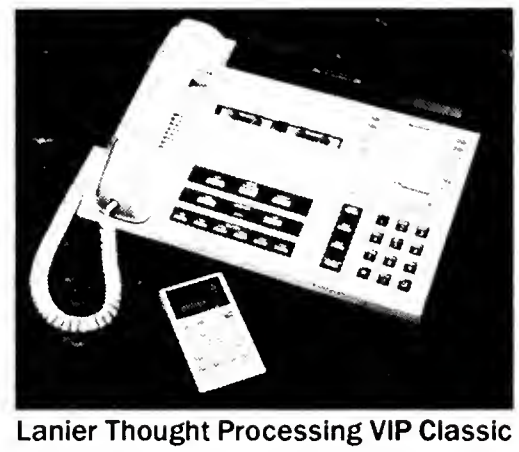
Help/38 Systems, Inc. has announced the **Telexpro** system, designed to tie the international telex network to every workstation in an IBM System/38 system.

The system plugs into any System/38 workstation port with a single twin-axial cable. Users then plug in their existing telex or TWX line to the Telexpro computer. Telexpro incorporates the user's word processing system, so users can direct any telex into any data base file.

Telexpro is priced at $8,950.

Help/38 Systems, 210 Baker Road, Minnetonka, Minn. 55345.

■



Lanier Thought Processing VIP Classic

The **Lanier Thought Processing Division** of **Harris Business Information Systems** has announced the **VIP Classic**, a combination microcassette dictation unit, full-featured telephone and a telephone answering system.

The VIP Classic has a speakerphone and offers speed dialing, redialing, a telephone record capability and an alarm system.

The VIP Classic is priced at $795.

Lanier Thought Processing, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

Protocol converters

Method Systems, Inc. has introduced the **PCT-100 Programmable Communications Translator**, a user-programmable in-line RS-232 protocol and data translator.

The PCT-100 is used to interface laser printers to existing computer or word processing systems. It emulates the old printer so that it is not necessary to modify existing hardware or software.

The single-quantity price is $495.

Method Systems, 3511 Lost Nation Road, Willoughby, Ohio 44094.

■

NCR Comten, Inc. has enhanced its **Comten Integrated Protocol Converter (IPC)** to give more flexibility in configuring networks and managing network integrity and security.

The enhancements allow users to program line control characteristics, such as inactivity disconnect timers or password designations, on a line-by-line basis.

There are also security enhancements that include information management systems queue flushing and password protection.

The Comten IPC price ranges from $6,100 to $15,450. Two-year lease prices vary from $296/mo to $746/mo. Current users can upgrade at no cost.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

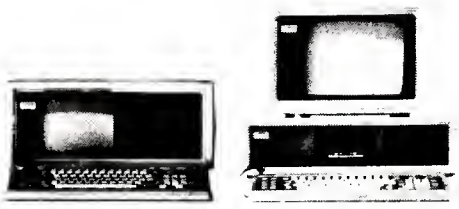
■

TRW, Inc.'s Information Networks Division has introduced the **Dual Port 3278 Interface** and the **Multiport 3274 Interface** units.

The interfaces allow IBM 3270-type terminals to emulate one of five asynchronous terminal types, providing 3270 connection to an asynchronous host via the local-area net.

The Dual Port 3278 supports up to

Continued on page 126



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NEW PRODUCTS/COMMUNICATIONS

Continued from page 122

two IBM 3270 Coaxial A terminal devices. The Multiport 3274 provides asynchronous ASCII-to-IBM connections. It comes in 16- or 32-port configurations through RS-232 connections.

The Dual Port 3278 Interface is priced at $1,800. In the 16-port configuration the Multiport 3274 is priced at $17,700 and the 32-port configuration at $32,800.

TRW, 23800 Hawthorne Blvd., Torrance, Calif. 90505.

Software

Network Research Corp.'s Fusion network software now supports TCP/IP protocols for Micom Systems, Inc.'s NI5010 Ethernet controller board.

This lets IBM Personal Computer users running Microsoft Corp.'s MS-DOS communicate with other systems using the TCP/IP protocol suite.

TCP/IP protocols can be used in applications such as file transfer, remote login and electronic mail. Developers can access the Fusion library of system calls to create their own TCP/IP applications.

Prices are $750 for Fusion software and from $575 to $725 for the NI5010.

Network Research, 2380 N. Rose Ave., Oxnard, Calif. 93030.

Multiplexers/modems

Universal Data Systems, Inc. is set to introduce four modems — **Sync-Up 208A/B, Sync-Up 201C, Fastalk 2400** and **224 A/D** — at the Comdex/Fall '85 show.

Sync-Up 208A/B is for use with the IBM Personal Computer family of microcomputers. It features synchronous automatic dialing and plugs into a single slot. It permits half-duplex operation at 4.8K bit/sec. over dial-up networks and full-duplex operation over four-wire leased lines. It comes with Sync-Up 3780, a synchronous communications software package that emulates an IBM 2780 or 3780 terminal.

Sync-Up 201C is also for use with the IBM Personal Computer family. It features synchronous automatic dialing and permits half-duplex operation at 2,400 bit/sec. over dial-up networks.

Fastalk 2400 operates with the IBM Personal Computer and compatibles. It is a full-featured Hayes Microcomputer Products, Inc.-compatible unit with an RS-232 interface. It operates in full-duplex mode at 2,400 bit/sec. over the dial-up networks and also functions as an AT&T 212A or 103 series modem at fallback rates of 1,200 and 300 bit/sec.

The 224A/D was designed for communications applications involving dumb terminals but can be used with micros.

It features asynchronous communcations at 0 to 300, 1,200 and 2,400 bit/sec. and synchronous communications at 1,200 and 2,400 bit/sec. It permits full-duplex operation over dial-up networks and can function as an AT&T 212A or 103 series modem at fallback rates of 1,200 and 300 bit/sec.

All four modems feature automatic answer, automatic tone or pulse dialing selection and built-in diagnostic testing.

Prices for the Sync-Up 208A/B, the Sync-Up 201C, the Fastalk 2400 and the 224A/D are $1,200, $625, $625 and $645, respectively, the vendor said.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.

Local-area networks

3M Interactive Systems has introduced the **3M Model 80 Channel Translator** and the **3M Model 70 Preengineered Cable System.**

The Model 80 translator was designed specifically for use with smaller local-area networks. It provides translation for up to three separate 3M LAN/I and/or 3M LAN/PC networks on a single broadband cable system.

It features uniform translation over five channels.

The Model 70 cable system consists of a set of six broadband cable systems that permit installation of a local-area network in areas ranging from 10,000 to 160,000 sq ft. The preengineered cable network is equipped with regularly spaced taps for plug-in access all along the cable, the vendor said.

There is a description/instruction manual on the cable system available free of charge.

The Model 80 Channel Translator is priced at $590, and the Model 70 Preengineered Cable System's prices range from $500 to $3,500, the vendor said.

3M Interactive Systems, Department IP85-32, 3920 Varsity Drive, Ann Arbor, Mich. 48104.

Test equipment

Telebyte Technology, Inc. has introduced the **Model 301 Mini Analyzer** for testing and monitoring data communications circuits.

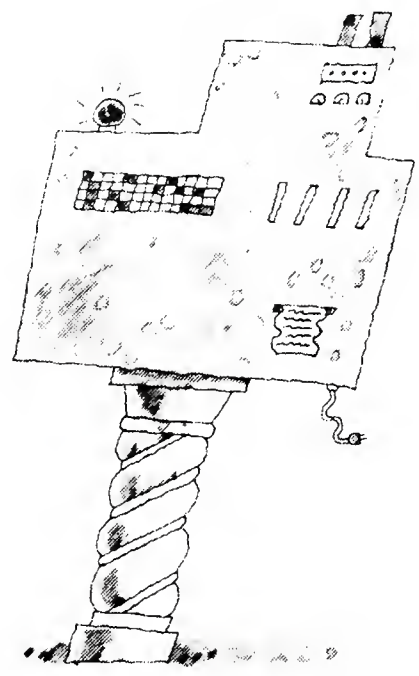
The Mini Analyzer displays key signals, interrupts selected signal paths and patches new configurations.

It is composed of two modules: one for display and one for patching. Each module is equipped with a male and a female DP-25 connector, which allows placement at any point of an RS-232 cable path. The display module continuously monitors and displays eight signals of the RS-232C data path. The patching function is performed by a mini patch box that breaks the 23 signal paths of the interface with both ends terminated on female jack receptacles.

The Model 301 costs $85, the vendor said.

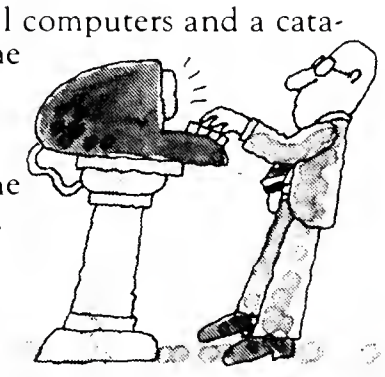
Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

WANTED: OLD THINKER TOYS.

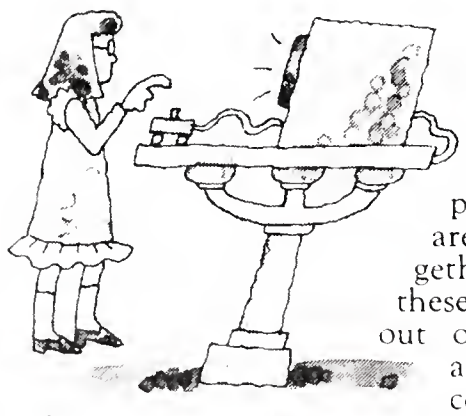


CW Communications, ComputerLand and The Computer Museum invite you to send in your early personal computers, software, and memorabilia — you could win a free trip to The Computer Museum in Boston

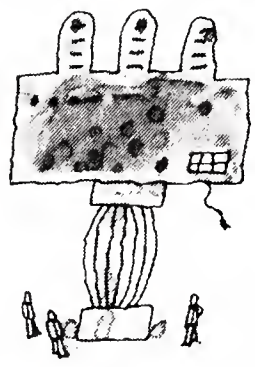
Your old, dusty "thinker toy" may now be ready to become a treasured museum piece. The Computer Museum in downtown Boston — an international museum dedicated entirely to computing — is searching for the very best and most unique relics of the personal computer revolution.



evolution of personal computers and a catalog highlighting the Museum's collections. If your submission is accepted for addition to the Museum collection, you will be invited to the grand opening of the exhibit and will receive a bound edition of the catalog. If your item is selected as one of the five best "finds", you will also receive an all-expense-paid trip to Boston for the grand opening party.



ComputerLand, CW Communications, and The Computer Museum are working together to bring these early relics out of your attic and into the collection of The Computer Museum. The museum is especially looking for kit machines, prototypes, programs, output, newsletters and memorabilia of early computing from around the world. A selection of the finest items will be used to create an exhibit on the



So, get up to the attic, down to the cellar and into your closets, and tell us what you find! Call or write the Museum for an official entry form, or send a photo and description of your items by March 1, 1986 to: The Computer Museum, Personal Computer Competition, 300 Congress St., Museum Wharf, Boston, Massachusetts USA 02110, (617) 426-2800, Telex: 62792318.

ComputerLand

The Computer Museum

CW COMMUNICATIONS/INC.

Entries will be judged on significance, rarity, date, completness and condition. Items particularly sought include pre-1980 machines, early serial numbers (get those number 1's out), machines made for purchase outside of North America (even modern machines are sought in this category), first releases of software such as first releases of operating systems, languages and mass-marketed and original applications, and pre-1980 photographs, newsletters, manuals and other records. The Computer Museum is a private non-profit educational institution. All donations are tax-deductible according to the provisions of the Internal Revenue Service. Thinker Toys is a registered trademark of George Murrow & Murrow Designs, Inc.

IBM ANNOUNCES LAN STANDARD

TOKEN-RING — WHAT ARE THE BENEFITS?

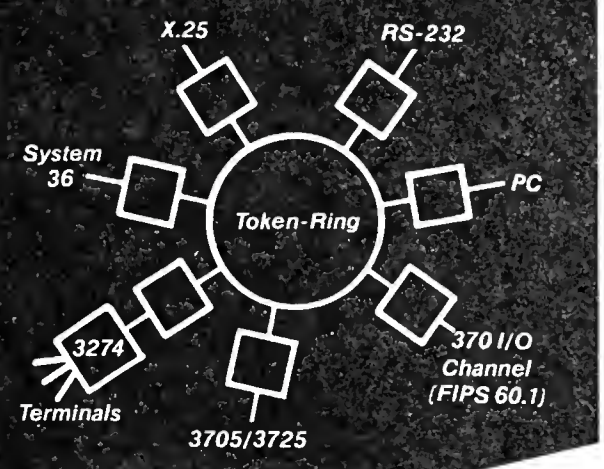
Q. Is Token-Ring a solid concept and what are the advantages?

A. The impact of IBM's influence will ensure the viability of Token-Ring as a standard.

Q. Why should I use Token-Ring?

A. Token-Ring is the new standard for high-speed local area networks. Based on IEEE 802.2 and 802.5, the NESTAR/IBM Token-Ring offers:

- A standard way to connect office computers, terminals, and printers
- High performance — 4 Mbits/sec
- Choice of media
- Low error rate
- Extensive self-diagnostics
- Open hardware/software architecture
- Third-party hardware/software products



NESTAR DELIVERS SAME

Effective immediately, NESTAR is shipping token-passing baseband LAN products for use with the recently expanded IBM cabling system options: shielded or unshielded twisted pair.

On Oct. 15, 1985, NESTAR Systems, Inc. announced the availability of state-of-the-art LAN systems that are 100% compatible with IBM's strategic direction and complementary to IBM's product offerings.

NESTAR will support use of IBM Token-Ring Network in conjunction with NESTAR PLAN™ 3000, 4000, and 5000 systems.

Support of the Token-Ring Network will be available as an upgrade to current NESTAR's PLAN Series™ and will become a standard feature of all new installations following first quarter 1986.

NESTAR is now accepting orders for IBM PC Token-Ring Adapters and Multistation Access Units. NESTAR also announces new models of the PLAN Series file servers, which incorporate both the IBM Token-Ring and ARCNET™ as standard components.

NESTAR's PLAN Series provides flexibility in communicating to mainframes and networked PCs.

NESTAR's family of products includes PLAN 1000 device servers, PLAN 2000 PC-based servers, the PLAN 3000, 4000, and 5000 multi-function servers; network interface cards for IBM and Apple personal computers, and PLANPak,™ a suite of ready-to-use integrated multi-user applications software.

NESTAR builds added value into IBM standard. Backed by NETAMERICA and a solid product history.

NESTAR, recently purchased by communications conglomerate NETAMERICA, offers customers immediate advantages in this new network technology by running on reliable, high-performance, high-capacity servers — a product capability not available from IBM. NESTAR customers can rest assured that their LAN investments are backed by the clout of the IBM standard.

For Immediate Information call (415) 493-2223 11/85

☐ Please send me information on NESTAR's PLAN Series of products
☐ Please send me a copy of "Executive Briefing"
☐ Please send me more information on Token-Ring technology

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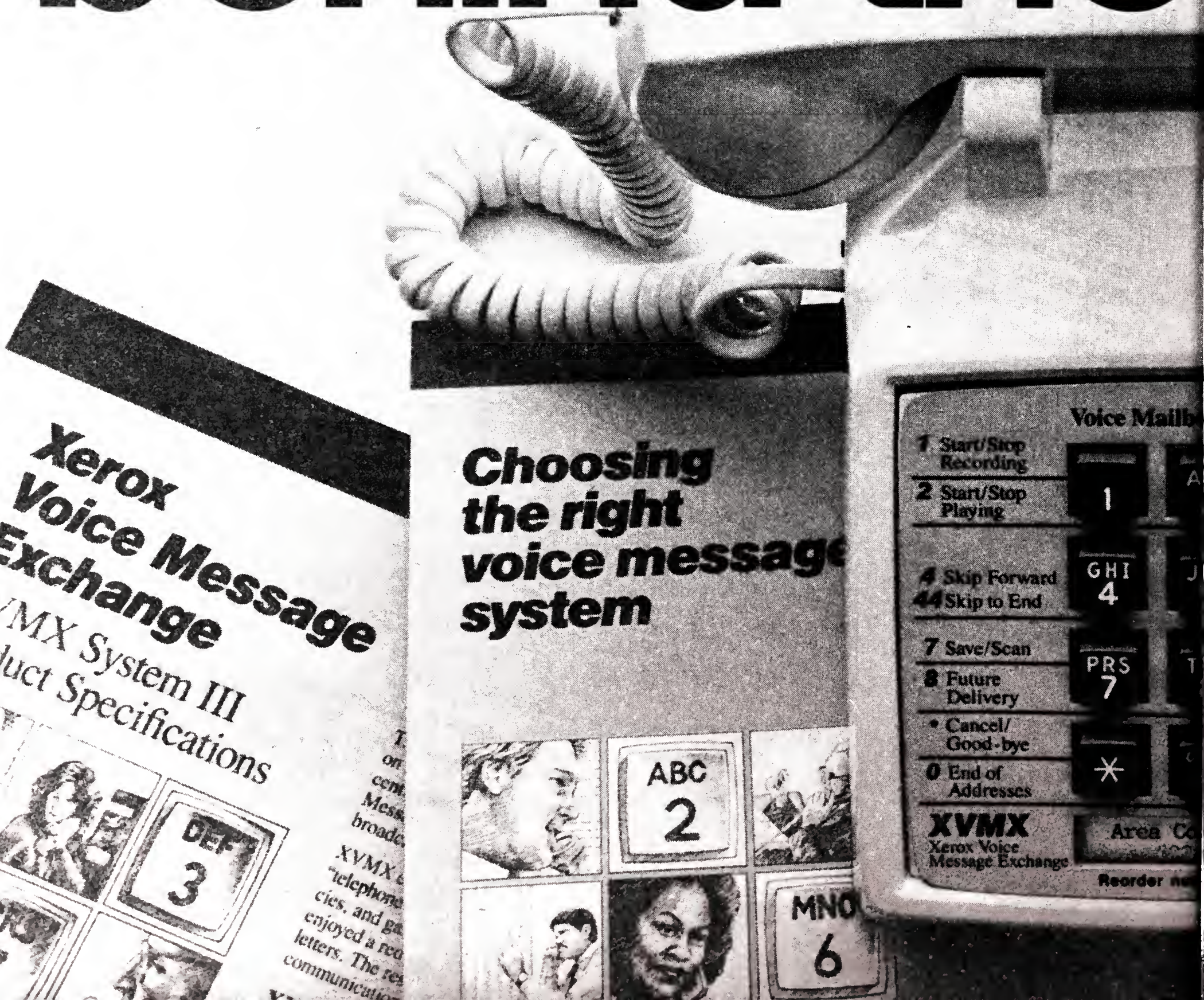

designed to complement it.

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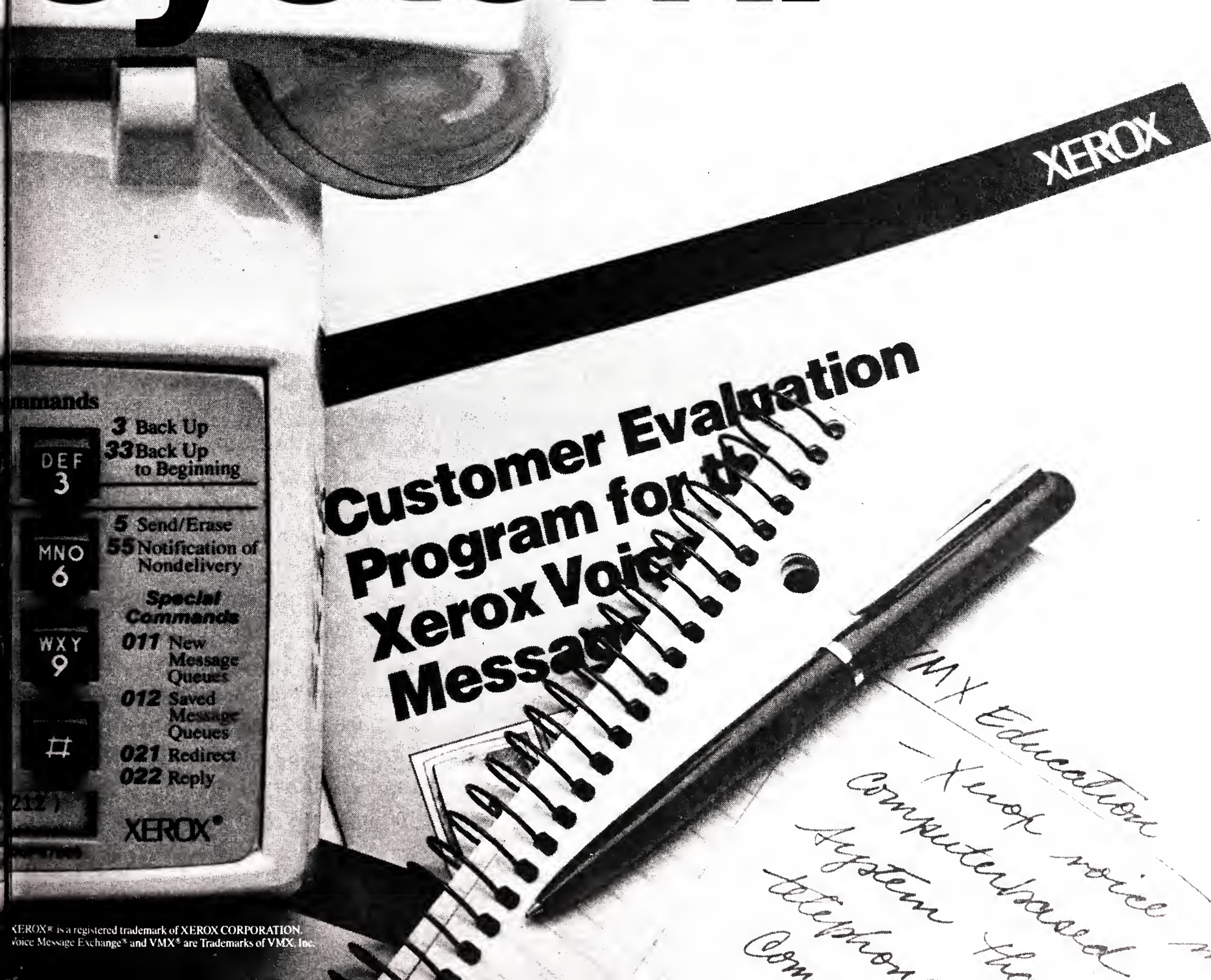

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Auxiliary equipment

Western Telematic, Inc. is introducing at Comdex Fall '85 its **TAS-41** terminal-activated switch that allows four users to share one computer port and its **SS-16**, a 16-port smart switch for RS-232 networking.

The TAS-41 allows each of four users to connect and disconnect to one computer port by entering commands from the remote terminal's keyboard. If a user forgets to log off, a time-out feature automatically disconnects the port within a user-selectable time period.

The SS-16 allows users to create an any-port-to-any-port local-area network, linking terminals, modems, printers or computers. Switching capabilities include computer port expansion and sharing, remote data gathering and personal computer training laboratories. Up to eight pairs of ports can communicate simultaneously. It accommodates rates between 150 and 19.2K bit/sec.

The TAS-41 is priced at $395, and the SS-16 costs $1,895.

Western Telematic, 2435 South Anne St., Santa Ana, Calif. 92704.

■

Arbo Connections, a division of **Arbo Corp.**, has introduced a line of **Switchboxes**, devices that can connect multiple computers to any peripheral.

Switchboxes allow a computer user to attach up to five peripherals to one computer — or up to five computers to the same peripheral — with a single turn of a dial. They use IBM parallel connectors, nine-line and 25-line RS-232 connectors, 15-line RS-422 connectors or 36-line Centronics Data Computer Corp. connectors.

Prices start at $115.

Arbo Connections, 18047 N.E. 68th St., Redmond, Wash. 98052.

SYSTEMS & PERIPHERALS

Data storage

Tallgrass Technologies Corp. has announced the **Flexstor** series of internal hard disks ranging from 25M to 80M bytes.

The Flexstor series comprises four disks equipped with Backtrack software that is said to back up data files automatically. The controller and disks are priced separately, and each product carries a limited one-year warranty.

Prices for the Flexstor series are $1,195 for the half-height, 25M-byte TG-5525i; $2,395 for the full-height, 35M-byte TG-5535i; $2,595 for the full-height, 50M-byte TG-5550i; and $3,595 for the 80M-byte, full-height TG-5580i.

Tallgrass, 11100 W. 82nd St., Overland Park, Kan. 66214.

■

Distributed Logic Corp. (Dilog) has introduced the **DQ226** controller board that allows Digital Equipment Corp. users to connect one or two storage module drive-compatible disk drives to any of DEC's Q-bus computers.

The controller features Dilog's Universal Formatting system that permits the attachment of drives that have different performance characteristies without having to configure the controller to handle the various drive types.

The DQ226 is compatible with storage module drive disk drives made by Ampex Corp., Control Data Corp., Century Data Systems, Inc. and others. The controller offers full 22-bit Q-bus addressing and is capable of handling transfer rates up to 2.5M bit/sec.

It is priced at $1,980.

Dilog, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Terminals

Tatung Company of America is set to introduce the **CM-1376** high-resolution red-green-blue analog color monitor at the Comdex/Fall '85 show.

The monitor was designed for use with the IBM Professional Graphics Adapted Card and is compatible with the IBM Model 5175 color monitor.

The CM-1376 features a 13-in. screen and offers a palette of more than 4,096 display colors. Resolution is 640 by 480 pixels.

The CM-1376 is priced at $999.

Tatung Company of America, 2850 El Presido St., Long Beach, Calif. 90810.

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Through our network you can hook up to your customers, suppliers and dealers. And how will that benefit you?

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Your Connection to Industry Networks

There are also cases where an industry benefits from the efficient exchange of information.

In the property and casualty insur-

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Ampex Corp. is introducing at Comdex/Fall '85 the **Ampex 219** and the **Ampex 220**, two Digital Equipment Corp.-emulating VDTs.

The Ampex 220 is fully compatible with the DEC VT220 terminal, and the Ampex 219 is compatible with the DEC VT100 terminal. Both feature programmable, color-coded function keys; a detachable/adjustable keyboard; and a choice of green or amber 14-in. screen.

The Ampex 219 is priced at $649, and the Ampex 220 costs $749.

Ampex, 401 Broadway, Redwood City, Calif. 94063.

Printers/plotters

Minolta Corp. has introduced its **Minolta Computer Assisted Retrieval (Mincar)** system.

The system allows for both data entry of documents into the computer and automatic retrieval of data on the Minolta RP 505 plain-paper reader-printer. Mincar incorporates Minolta reader-printers and the Micro Auto 16 planetary recorder with Mincar software, operational in a variety of IBM and Digital Equipment Corp. environments, including the IBM Personal Computer XT and AT, IBM Series/1, IBM System/36 and DEC VAX.

Prices range from $6,000 to $60,000, depending on the configuration.

Minolta, 101 Williams Drive, Ramsey, N.J. 07446.

Output Technology Corp. is introducing the **OT-700E** dot matrix printer at the Comdex/Fall '85 show.

The OT-700E is an enhanced version of the company's OT-700. It operates at 700 char./sec. It was designed for use with micro, mini and mainframe host systems. The printer offers 350 char./sec. correspondence-quality printing; dual-mode addressable graphics and front-panel menu programming; as well as an 8K-byte buffer; IBM character set; Epson America, Inc. Epson FX and Digital Equipment Corp. LA-120 emulation; and multipitch printing.

The OT-700E costs $1,995.

Output Technology, Bay 33, 9922 E. Montgomery Drive, Spokane, Wash. 99206.

Graphics systems

Vidar Systems Corp. has announced its **Model 4220** image processing scanner.

The 4220 converts graphics images on paper to digitized electronic form for computer storage, manipulation and retrieval. At any point in the process, the image can be reconverted to hard copy. The process takes 30 seconds, according to a company spokesman.

The Model 4220 costs $69,900.

Vidar Systems, 520 Herndon Pkwy., Herdon, Va. 22070.

Power supplies

Intecolor Corp. has introduced an **autoranging power supply option** for its 14-in. color graphics terminals.

The optional power supply allows terminals to operate over wide voltage and frequency ranges without using switches and jumpers.

The price for quantities of 100 is $90 apiece.

Intecolor, 225 Technology Park, Norcross, Ga. 30092.

■

Isoreg Corp. has introduced the **Isoshield** line of computer power isolators.

The three-phase line incorporates power surge protection with step-down transformer action and three-phase power distribution for shielding computers from voltage spikes and surges.

The computer power isolators are available in 13 three-phase power ratings from 6 kVA to 300 kVA. Representative prices are $2,480 for the 30-kVA model, $6,100 for the 75-kVA model and $16,100 for the 300-kVA model.

Isoreg, P.O. Box 486, Littleton, Mass. 01460.

■

Single and multiple output 1,200W **switching power supplies** are available from **Computer Products, Inc.**

The power supplies provide remote inhibit, remote margining of the main output and remote sense on all outputs. Single-, dual-, triple- and quadruple-output configurations are offered.

The power supplies cost from $1,075 for single-output models to $1,295 for quadruple-output models.

Computer Products, Power Conversion Group, 2900 Gateway Drive, Pompano Beach, Fla. 33069.

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NEWS

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In order to adequately perform their jobs, office workers need to access information from other parts of the organization —specifically on the mainframe or mini—FAST.

We offer solutions that communicate to IBM, DEC, HP and most other major systems in a number of different ways.

NBI supports all the common asynchronous terminals, including VT100, the synchronous batch protocols such as IBM's 2780 and 3780 and the interactive synchronous protocols such as IBM's 3270 bisynch and 3270 SNA.

NBI's advanced data communications make it inexpensive and easy for office users to capture data from the host, on any of our PC or multifunctional workstations.

So, if you want the office system designed to talk to office workers as simply and effectively as it talks to mainframes and mini's—call NBI and let's talk facts.

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For more information, contact your local NBI representative or call 1 800 255-5550 extension 717.

CALL FOR PAPERS

MUMPS USERS' GROUP 15TH ANNUAL MEETING
San Diego, June 9-13

Papers and demonstrations/presentations are solicited in all topic areas applicable to MUMPS.

The deadline for submission of papers is Dec. 2, and they should be sent to MUMPS Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

CUSTOM INTEGRATED CIRCUITS CONFERENCE
Rochester, N.Y., May 12-14

The Custom Integrated Circuits Conference is sponsored by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) Electron Devices Society; the IEEE Rochester Section; and the IEEE Solid-State Circuits Council.

Original papers are solicited in the following areas: computer-aided design — device and process modeling, circuit simulation, logic simulation, fault grading, testability analysis, layout verification and very large-scale integration design aids; gate arrays, standard cell and full custom integrated circuits — trade-offs and design techniques, CMOS, N-channel MOS, bipolar and gallium arsenides; applications — digital signal processing integrated circuits, smart power integrated circuits and smart sensor integrated circuits; and fabrication technologies — silicon and nonsilicon, mixed processes and direct wafer writing.

Deadline for submission is Dec. 2. Papers should be sent to Roberta Kaspar, Executive Secretary, Custom Integrated Circuits Conference '86, Ledgewood Drive, Rochester, N.Y. 14615.

SIGPLAN '86: SYMPOSIUM ON COMPILER CONSTRUCTION
Palo Alto, Calif., June 23-27

Authors are invited to submit papers on all aspects of programming language translation.

Topics of interest include solutions to specific language translation problems, new techniques for compiling specific language families, techniques for retargetable and rehostable compilers, code optimization techniques and their practical effects and compiler generation tools.

Summaries must be received by the program chairman by Dec. 1. Summaries should be sent to Stuart I. Feldman, Room 2D-396, Bell Communications Research, 435 South St., Morristown, N.J. 07960.

LIGHTNING CONFERENCE
Dayton, Ohio, June 21-24

This conference is being sponsored by the National Interagency Coordination Group of the National Atmospheric Electricity Hazards Protection Program in conjunction with the Florida Institute of Technology.

Papers dealing with research and protection of aircraft, helicopters, aerospace vehicles, ships and ground facilities against the atmospheric electrical hazards associated with lightning and static electricity may be submitted.

Papers are due no later than Dec. 13. Authors submitting papers should direct them to Conference Chairman Lawrence Walko, U.S. Air Force, AFWAL/FIESL, Wright-Patterson Air Force Base, Ohio 45433.

ELECTROMAGNETIC COMPATIBILITY
San Diego, Sept. 16-18

This Institute of Electrical and Electronics Engineers, Inc. International Symposium is seeking unpublished papers on all aspects of electromagnetic compatibility.

Suggested topics include, but are not limited to, the following: analysis, control, design, electromagnetic environment and electromagnetic pulse, ESD, filters, instrumentation, theory, lightning, magnetics and materials.

Prospective authors should submit abstracts by Dec. 13 to the Technical Paper Chairman, Edward Skomal, Aerospace Corp., MS:M4/937, P.O. Box 92957, Los Angeles, Calif. 90009.

THE 24th ANNUAL MEETING OF THE ASSOCIATION FOR COMPUTATIONAL LINGUISTICS
New York, June 10-13

Papers are invited on all aspects of computational linguistics, including, but not limited to, pragmatics, discourse, semantics, and syntax; understanding and generating spoken and written language; linguistic, mathematical and psychological models of language; and phonetics and phonology.

Papers are due Jan. 6 and should be submitted to Alan Biermann, Program Chair, Department of Computer Science, Duke University, Durham, N.C. 27706.

INTERNATIONAL CONFERENCE ON COMPUTER VISION AND PATTERN RECOGNITION
Miami Beach, June 22-26

The Institute of Electrical and Electronics Engineers, Inc. Computer Society has announced a call for papers for this international conference. Conference topics include, but are not limited to, three-dimensional vision; image understanding systems; geometrical reasoning systems and robot vision; edges, lines and contours; texture analysis and reconstruction; vision hardware; pattern analysis; and applications of computer vision.

Submission deadline for long and short papers is Jan. 7. The deadline for poster presentations is Feb. 4. Papers should be submitted to Prof. Michael Brady, Department of Engineering Science, Oxford University, Parks Road, Oxford OX1 3PJ England.

SIXTH INTERNATIONAL WORKSHOP ON EXPERT SYSTEMS AND THEIR APPLICATIONS: CONFERENCE AND EXHIBITION
Avignon, France, April 28-30,

Original papers are now being sought for this Sixth International Workshop. Papers are solicited in all areas relating to expert system technology.

All papers are due by Jan. 15.

Contact the Workshop Chairman, Jean-Claude Rault, Agence de l'Informatique, Tour Fiat-Cedex 16, 92084 Paris-La Defense, France.

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The time has come for straight talk about database management systems.

"The only reason to buy a database management system is to build better applications."

Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEO's of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

John J. Cullinane
Chairman of the Board

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The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of on-line and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/1, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS

Cullinet

400 Blue Hill Drive, Westwood, MA 02090-2198/1-800-551-4555

NEWS

CALENDAR

WEEK OF DECEMBER 8

DECEMBER 8-11, CHICAGO — **1985 Fall Industrial Engineering Conference.** Contact: Stephanie Starr, Institute of Industrial Engineers, 25 Technology Park, Atlanta, Norcross, Ga. 30092.

DECEMBER 9-10, BOSTON — **Systems Analysis & Design for the HP 3000.** Contact: Charles Volz, Volz Associates, 34 Undine Ave., Winthrop, Mass. 02152.

DECEMBER 9-10, DALLAS — **Third Annual Microcomputer Conference.** Contact: Financial Managers Society, Inc., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

DECEMBER 9-10, LOS ANGELES — **Introduction to VSE/SP 2.1 for Systems Programmers.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 9-10, ORLANDO, FLA. — **Satellite Communications.** Contact: TMSA Seminars, c/o Technology Training Corp., P.O. Box 3608, Dept. SATCOM, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held Dec. 12-13 in Washington, D.C.

DECEMBER 9-10, SOMERSET, N.J. — **Writing Management Reports.** Contact: Mary Ann Cluggish, Information Mapping, Inc., 275 Wyman St., Waltham, Mass. 02154. Also being held Dec. 11-12 in Somerset and Jan. 7-8 in Boston.

DECEMBER 9-10, WEST PALM BEACH, FLA. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 9-11, SAN FRANCISCO — **Telecommunications Management.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 9-11, WASHINGTON, D.C. — **Financial Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

DECEMBER 9-13, LOS ANGELES — **Telecommunications and Communications Engineering Program.** Contact: University of California at Los Angeles Extension, Department of Engineering and Science, P.O. Box 24901, Los Angeles, Calif. 90024.

DECEMBER 9-13, MIAMI BEACH, FLA. — **The 2nd Conference on Artificial Intelligence Applications.** Contact: Trade Associates, Inc., Exposition Management, Suite 200, 12250 Rockville Pike, Rockville, Md. 20852.

DECEMBER 9-13, NEW YORK — **VTAM for Practitioners.** Contact: Judith Anderson, American Data Group, Inc., 3685 Woodberry Drive, Duluth, Ga. 30136.

DECEMBER 10-11, WASHINGTON, D.C. — **T-1 and Virtual Networks.** Contact: Telestrategies, Inc., P.O. Box 811, 1355 Beverly Road, McLean, Va. 22101.

DECEMBER 10-12, COLUMBUS, OHIO — **EASE Authoring Workshop.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 10-12, PHILADELPHIA — **1985 Videodisc, Optical Disk & CD-ROM Conference/Exposition.** Contact: Jean-Paul Emard or Marilyn Reed, Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

DECEMBER 10-12, TOKYO — **Interface in Japan.** Contact: Peter B. Young or Linda M. Yogel, The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

DECEMBER 11-13, ANAHEIM, CALIF. — **Dexpo West '85 — The Eighth National DEC-Compatible Exposition.** Contact: Carol Henderson, Expoconsul International, Inc., 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

DECEMBER 11-13, WEST PALM BEACH, FLA. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 12-13, BOSTON — **PC as a Programmer/Analyst Workstation.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

DECEMBER 12-13, DALLAS — **Troubleshooting the Data Communications Networks.** Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940. Also being held Dec. 19-20 in Boston.

DECEMBER 12-13, SAN FRANCISCO — **Financial Analysis for Telecommunications Equipment Acquisition.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 13, DALLAS — **MIS/DP/Telecommunications Consultants.** Contact: Barbara Mooschekian, Infomart, 1950 Stemmons Freeway, Dallas, Texas 75207.

WEEK OF DECEMBER 15

DECEMBER 16-18, NEW YORK — **Data Analysis & Logical Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

DECEMBER 17-19, WASHINGTON, D.C. — **System 2000 Applications Programming Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

DECEMBER 19, COLUMBUS, OHIO — **DOS/VSE Working with Shared DASD.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

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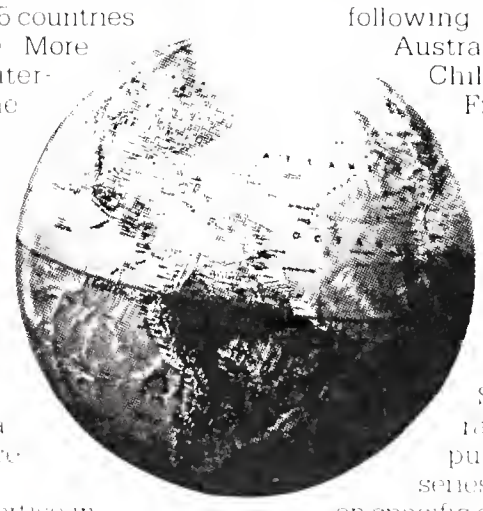

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COMPUTER INDUSTRY

INDUSTRY INSIGHT
Clinton Wilder
CW Senior Writer

Lessons for the big boys

It is a rare week when the top executives of both the world's largest and second largest computer companies publicly share their views on the state of the industry. Such an event occurred two weeks ago, with IBM's John Akers addressing British securities analysts in Scotland two days before Digital Equipment Corp.'s Ken Olsen spoke to his company's shareholders an ocean away at DEC's annual meeting in Boston.

Both men showed an unbridled optimism for the long-term growth of their companies, albeit tempered by discouraging predictions that the industry slump will probably linger on through most of 1986. But what is interesting to note is that neither Akers nor Olsen said he believes the "Great Slump of '85" has signified a fundamental change in the nature of the industry.

"Is our industry suffering from more than a cyclical slowdown?" Akers asked rhetorically. "Are we seeing major structural changes, a decline in total demand? . . . The answer is, 'No.' Our industry has always been driven by scientific and technological progress. . . . I am convinced those same forces will continue to drive our industry in the years ahead."

Ah, technology to the rescue once again. Ken Olsen feels the same way. In Olsen's view, if MIS managers aren't beating a path to Maynard, Mass., for Microvax IIs, VAX 8600s and "the Digital style of computing," it's not because of cautious capital spending; it's because "we're not getting our message across."

In a statement that raised a few press conference eyebrows, Olsen essentially claimed that DEC's superior technology and system connectivity — and make no mistake, most of it is truly impressive — make the company immune to economics. In a slow growth period, he reasoned, the VAX line will gobble up market share; and when

See **LESSONS** on page 146

DEC's IBM micro coming

Olsen: A more costly, more functional machine

By Clinton Wilder

BOSTON — Digital Equipment Corp. will introduce its first completely IBM-compatible microcomputer and will continue to push its Ethernet networking capabilities in the coming year, DEC President Kenneth H. Olsen said at the company's recent annual meeting.

DEC President Ken Olsen

Olsen said DEC's forthcoming Microsoft Corp. MS-DOS-based micro, which is currently in the testing stage, came in response to DEC customer pressure for an IBM-compatible machine. Most industry observers felt DEC's Rainbow personal computer failed because it lacked that compatibility, although Olsen blamed its demise on DEC "trying to go after a retail market that didn't appreciate quality."

"We won't sell an IBM clone, and we won't target it to retail customers," Olsen said of the new machine. "We will satisfy our customer needs." He added that the system will be both more functional and more expensive than the IBM Personal Computer but would not comment on what microprocessor chip will drive it. He also declined to reveal when the product would be announced.

The bulk of Olsen's remarks to company shareholders was devoted to the networking capabilities of DEC's VAX product line. In the face of the slowdown in U.S. capital spending continuing through 1986, Olsen said DEC's goals are to increase its market share and to "make our networking the common approach in the industry."

Olsen shrugged off the effects of his own predictions that the computer industry will remain sluggish throughout next year and that the recent weakening of the dollar will have little positive effect. "We're in an ideal situa-

See **DEC** on page 151

BUSINESS NOTES

Apollo plugs into IBM

Apollo Computer last week signaled its intent to tap its workstation technology into the IBM mainframe environment. The Chelmsford, Mass.-based company said it will make a $3 million equity investment in Spectragraphics Corp. of San Diego. Additionally, the companies signed an $800,000 product development pact for Spectragraphics to provide a hardware and software gateway for Apollo's Domain products to plug into IBM hardware.

■

The semiconductor industry saw a possible sign of recovery last week as the San Jose, Calif.-based Semiconductor Industry Association announced that the book-to-bill ratio climbed to a year-high 0.82 in October. The 0.06

See **BUSINESS** on page 152

Worldwide data protection eyed

By Bryan Wilkins

WILLIAMSBURG, Va. — Information technology in developed and developing countries is "truly a transnational force, a disruptive force," according to Alan Westin, a professor of political science at Columbia University and a leading authority on the political implications of technology.

Westin was a featured speaker at a recent conference titled "International Information Economy," which addressed the issues of transborder data flows and privacy protection of data. He cited the experience of Hong Kong, which last year introduced an electronic car registration and monitoring system that set off a fight in the city over privacy. As a consequence, the Hong Kong government is expected to enact the first data and privacy protection law this year.

Westin also cited Japan, which has formed a commission to draft the nation's first privacy and data protection law within the next two years.

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INSIDE

Massachusetts Computer Software Council's purpose appears obscure/**138**

New U.S. Department of Defense procurement regulations are not welcomed by computer vendors that want to protect proprietary information/**144**

INSTANT ANALYSIS

"The growth of third-party and other maintenance alternatives is making the service sector of the computer industry more like automobiles, consumer electronics and even heavy industry."

— John T. Harnett director of industry services, Customer Service Division, TRW during a recent CW interview

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Mass. software council meets amid high attendance, enthusiasm

Group searching for clear identity

By John Desmond

NEWTON, Mass. — Its first meeting started with a lament about a newspaper story that said software does not work, and it proceeded to employ a slogan that has no clear basis in fact.

Thus, the Massachusetts Computer Software Council was formed.

Enthusiasm was high and attendance of some 250 people was impressive at the software council's meeting attended by the press. An identity for the group was anything but clear.

Some observers saw it as a liberal counterbalance to the conservative Massachusetts High Technology Council. But, said council member Mitch Kapor of Lotus Development Corp., "We had no mention of politics here today."

But the group did invite as its first speaker Massachusetts Gov. Michael Dukakis, a liberal Democrat preparing for reelection next year.

Recalling a story on software bugs from a major Wall Street daily newspaper, Kapor expressed hope that the new council could act as a "responsible and noninflammatory counterweight" that could be "more fair than some of what we've seen in the press" toward software companies.

Reason for slowdown

Such misunderstanding and confusion among consumers is one reason for a slowdown in the personal computer industry, he asserted. According to council founder Eric Vogt, president of Micro Mentor, Inc., a personal computer education company, "Massachusetts is the software capital of the world." When asked by *Computerworld* for the basis of that assertion, Vogt said it was not technically checked out.

Bureau of Labor Statistics data, according to John Hatch, director of communications of the Palo Alto, Calif.-based American Electronics Association, shows that California has 33,704 people employed in the production of software, while Massachusetts has 12,231. Both Virginia and Maryland employ more people in the production of software, 17,108 and 17,495, respectively, than does Massachusetts.

The number of companies employed in the production of software, as of June 1984, totals 1,940 in California and 517 in Massachusetts. New York is home to 1,038 software firms and Virginia, 691.

"I wouldn't say there is a software capital," Hatch said. "It's spread throughout the high-technology centers in the country."

Several in the press questioned why the software council was not formed as a subcommittee of the Massachusetts High Technology Council, which has 160 member companies representing 250,000 employees.

> *'The software capital is spread throughout the high-tech centers in the country.'*
>
> **— John Hatch**
> **American Electronics Association**

According to Vogt, "The High Technology Council has a lot to deal with already. Their plate is full."

High Technology Council President Howard P. Foley said no one had ever suggested to him that a special software subcommittee of his group be formed. "That might have made more sense. I have a feeling it would have been unanimously endorsed," Foley said.

The High Technology Council, which concentrates on policies regarding spending, taxation and education, is known as a conservative group in Massachusetts politics.

Perhaps the Software Council founders were trying to counter the image of high technology in the state as a conservative political force. "I think there's a grain of truth in that," Foley said. As far as Massachusetts being the software capital of the world, Foley said, "I hope they're right. And if we are, I hope we stay that way."

Common interests

The first president of the Massachusetts Computer Software Council, John Cullinane, president of Cullinet Software, Inc., said the organization was founded to further common interests of software companies. "There has always been a hardware myopia; software has been taken for granted," Cullinane said. "The software industry is unique and has its own needs."

Dukakis said for the software companies to reach consensus on certain issues would be helpful to state government. "The more you are a part of an organized effort, the better it will be for us," he said.

A number of ideas for what services the software council could offer were suggested by those attending. Ideas included a hot line resource service, a committee to evaluate business plans, help for start-up companies, a regional survey of compensation levels and personnel practices, help for firms considering overseas branches, an employment council to help find skilled workers, and an ombudsman council to resolve differences between companies and between clients and vendors.

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Market showcase to be built

By Mitch Betts

WASHINGTON, D.C. — Developers have broken ground for construction of the $250 million Techworld facility, a marketing showcase for information technologies in the nation's capital, much like Infomart in Dallas.

The first phase of the project, including two-thirds of the World Technology Trade Center and a hotel, will be completed by late 1987, according to officials of Washington, D.C.-based International Developers, Inc.

Techworld officials hope that the location of the four-acre site — next to the Washington Convention Center and close to government agencies — will be the facility's drawing card for vendors and buyers.

"There is no better location for it than right here in the world's largest and best marketplace," boasted Alan Bogatay, senior vice-president for marketing.

Oliver Smoot, executive vice-president of the Computer and Business Equipment Manufacturers Association, said the trade group views Techworld "both as a way to enhance public understanding of our industry and as an exciting marketing and educational opportunity."

In addition to the trade center, with 960,000 sq ft of showroom and office space and a 140,000 sq-ft conference center, the Techworld development includes an 800-room convention hotel, restaurants, shops, a technology museum and underground parking. The project is scheduled to be finished in early 1989, officials said.

Developers said Techworld will be equipped to house vendors' marketing and customer support offices.

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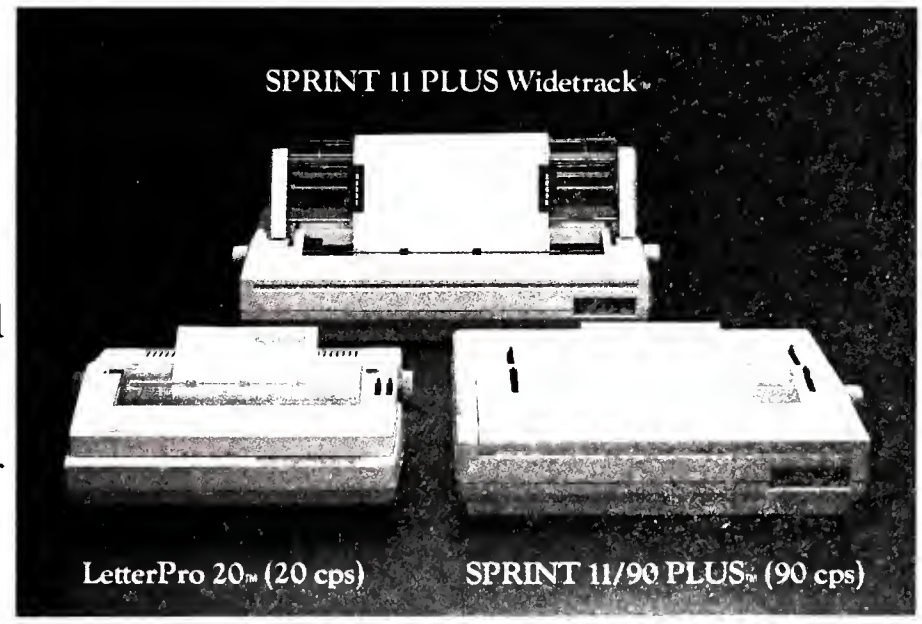

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ITC rules in favor of U.S. chip manufacturers

By Maura McEnaney

WASHINGTON, D.C. — U.S. semiconductor companies have suffered at the hands of Japanese chip makers practicing predatory pricing policies on erasable programmable read-only memory chips, the International Trade Commission (ITC) ruled recently.

The ITC's unanimous 5:0 ruling came earlier this month, about two months after semiconductor companies Intel Corp., National Semiconductor Corp. and Advanced Micro Devices, Inc. filed a petition asking the ITC to investigate instances of alleged dumping of Japanese chips in the U.S. market.

The case is one of several avenues now being pursued by U.S. companies to remove trade barriers with Japan. In June, the Semiconductor Industry Association (SIA) filed a petition with the U.S. Trade Representative's Office seeking relief from what it called discriminatory trade practices by Japan. That petition is still pending.

Key to the chip makers' argument in the ITC and SIA cases is a memo acquired from Japan's Hitachi Ltd., instructing its sales force to undercut U.S. chip prices by 10%. The Japanese countered U.S. allegations by arguing that because the U.S. exports chips for completion, there essentially is no U.S. chip market.

Before any action can be taken against Japanese firms, however, the ITC case must be heard by the U.S. Department of Commerce. Should the Commerce Department concur with the recent decision, the ITC can implement measures that could include imposing duties on Japanese chip imports.

A ruling from the Commerce Department is expected by March, and a final determination of the issue could come by July.

Silicon Valley semiconductor companies said they were pleased by the ITC ruling, while Japanese firms remained hopeful regarding the ITC indication that it would attempt to clarify further the definition of imports.

Agencies get poor ratings for security

By Mitch Betts

WASHINGTON, D.C. — On a scale of one to 10, computer security at federal agencies would rate a five or six, the U.S. House Committee on Science and Technology was told recently.

Computer systems in the U.S. government are highly vulnerable to abuse, destruction, error, fraud and waste, according to William S. Franklin, associate director of the information management and technology division of Congress' General Accounting Office (GAO).

At a committee hearing chaired by Rep. Dan Glickman (D-Kan.), Franklin said that of the 25 critical computer systems the GAO studied, none had a well-balanced computer security program that combined the management and technical controls recommended by government standards.

The survey found that only 10 systems had audit trails or logs and only nine had contingency plans that were tested; for three systems, there were no requirements that passwords be changed.

Glickman is holding a series of hearings on computer security in the government, using the testimony to build a case for legislation (H.R. 2889) that would require agencies to provide computer security training for employees.

At Glickman's request, the GAO studied 25 civilian computer systems, using criteria developed by the National Computer Security Center, the National Bureau of Standards, the U.S. Office of Management and Budget and the GAO.

The study focused on the government's most important systems, such as those at the Federal Aviation Administration, the Federal Reserve System and the Social Security Administration, Glickman said. The agencies responding to the survey were promised anonymity, Franklin said, so that their specific vulnerabilities would not be publicized.

Only five of the computer systems were protected by all of the physical, technical and administrative safeguards deemed necessary, Franklin reported. And most agencies did not have important management controls in place, such as a complete risk analysis, he said.

Agency officials frequently cited lack of management commitment and lack of funds as reasons for the shortcomings, Franklin said.

In many cases, the government agencies had partially implemented a security program but had not met all of the criteria that the security experts established. For example, the GAO survey found that 19 of the agencies had some sort of training, but only two had developed a formal, full-scale training program.

On the positive side, most agencies had a security officer, a computer security policy document and a password and user-identification system, had conducted a security audit and required badges for entry to the computer facility, the GAO survey showed.

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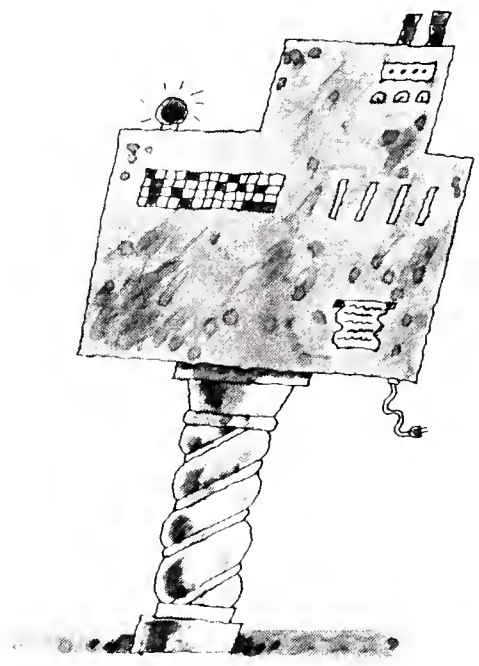
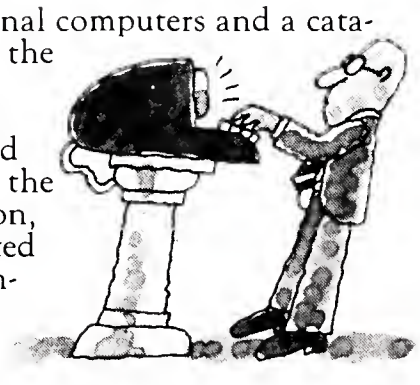
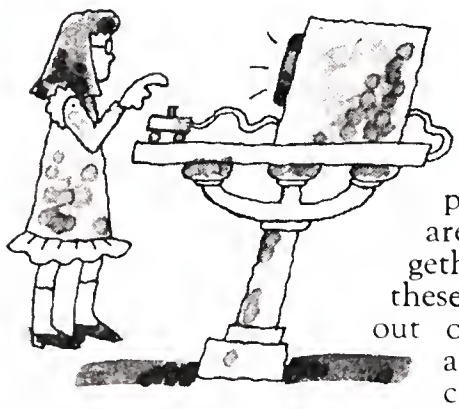


CW Communications, ComputerLand and The Computer Museum invite you to send in your early personal computers, software, and memorabilia — you could win a free trip to The Computer Museum in Boston

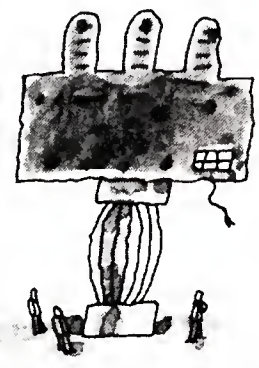
Your old, dusty "thinker toy" may now be ready to become a treasured museum piece. The Computer Museum in downtown Boston — an international museum dedicated entirely to computing — is searching for the very best and most unique relics of the personal computer revolution.



evolution of personal computers and a catalog highlighting the Museum's collections. If your submission is accepted for addition to the Museum collection, you will be invited to the grand opening of the exhibit and will receive a bound edition of the catalog. If your item is selected as one of the five best "finds", you will also receive an all-expense-paid trip to Boston for the grand opening party.



ComputerLand, CW Communications, and The Computer Museum are working together to bring these early relics out of your attic and into the collection of The Computer Museum. The museum is especially looking for kit machines, prototypes, programs, output, newsletters and memorabilia of early computing from around the world. A selection of the finest items will be used to create an exhibit on the



So, get up to the attic, down to the cellar and into your closets, and tell us what you find! Call or write the Museum for an official entry form, or send a photo and description of your items by March 1, 1986 to: The Computer Museum, Personal Computer Competition, 300 Congress St., Museum Wharf, Boston, Massachusetts USA 02110, (617) 426-2800, Telex: 62792318.

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Vendors blast Pentagon's high-tech procurement regulations

Rules require review of price, technology

By Mitch Betts

WASHINGTON, D.C. — The computer industry feels that the Pentagon has gone too far this time, and it is fighting back.

The industry is miffed about new U.S. Department of Defense regulations that require vendors to turn over their pricing and technical data for review when the Pentagon buys hardware and software.

"The . . . rules are viewed as stepping beyond congressional intent and giving away the farm," said a research bulletin from International Data Corp.'s (IDC) Washington, D.C., division. "Industry is pulling out the stops to make itself heard on the matter," it added.

At issue is the way the U.S. Congress and the Pentagon are trying to combat the procurement "horror" stories about spare parts overcharges. The Pentagon recently issued regulations to implement the Defense Procurement Reform Act of 1984, a legislative response to such notorious cases as the $7 hammer that cost the Pentagon more than $400.

The goal of the legislation and the regulations is to give Pentagon buyers all of the cost and technical data needed to evaluate procurements and to give that information to vendors so that, via reverse engineering, they can compete for future contracts.

But the computer industry argues that the regulations are too broad, because they lump commercial products in with the unique products that are sold to the military based on the vendor's cost claims.

> *'The rules are viewed as stepping beyond congressional intent and giving away the farm.'*
>
> — IDC report

"Unfortunately, we see today a growing confusion, a blurring in the minds of some regulators between procurement policies appropriate for cost-based products on the one hand and for commercial products on the other," according to Vico E. Henriques, president of the Computer and Business Equipment Manufacturers Association.

Henriques, testifying at a recent congressional hearing, argued that the new procurement rules "seem to be abandoning the idea that government seeks the lowest price that competition can reasonably produce and replacing it with the concept that government has the right to dictate commercial prices or gain access to the commercial suppliers' costs."

These new demands may gradually force the industry to scale back its dealings with the government, Henriques warned.

May affect prices

Also, the paperwork costs of the regulations may force vendors to raise the prices of their commercial products for all customers, simply because the government is a buyer, he indicated.

Henriques said the procurement scandals involved unique, military-specified products, not commercial products. He said the government has the right to scrutinize the cost claims of defense contractors, since their profits are based on a percentage of their development and manufacturing costs, to prevent profiteering at the taxpayers' expense.

But the prices of commercial products "are based on a highly competitive commercial marketplace, which determines what is a fair price," Henriques testified. The commercial price includes research and development costs for new products and a contribution to company profits as well as development and manufacturing costs, he said.

Henriques blasted the new Pentagon rules as "regulatory overreach" that would violate the propriety of commercial product information and called for legislation requiring different treatment for commercial and unique products.

IDC and other sources said the Pentagon plans to revise the regulations. Henriques welcomed these moves, but urged the Pentagon to develop a better relationship with commercial vendors. "A cooperative dialogue could go a long way toward avoiding the confrontational environment that has enshrouded government procurement in the past year," he said.

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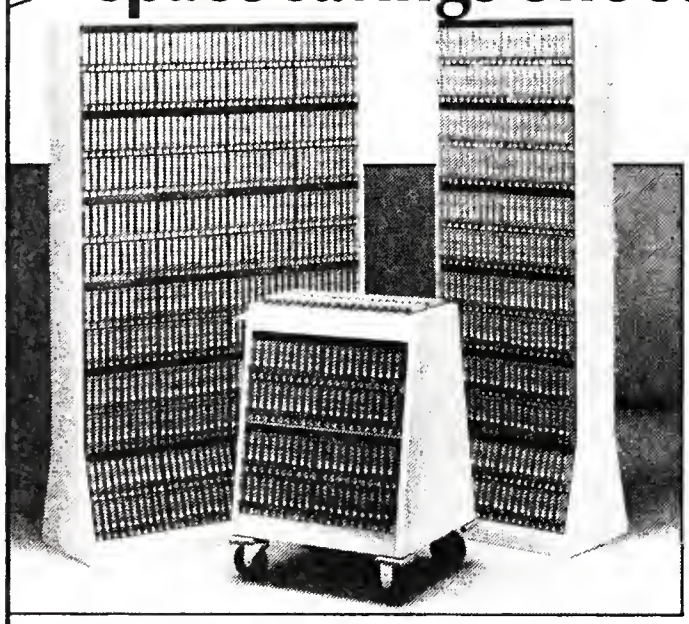

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Bell Atlantic calls on Justice to review AT&T divestiture

NEW YORK — Bell Atlantic Corp., stung by the Federal Communication Commission's approval of new high-volume services to be provided by AT&T, services that may bypass its own facilities, recently called on the U.S. Department of Justice to open a review of the AT&T divestiture terms and conditions.

Thomas Bolger, chairman and chief executive officer of Bell Atlantic, told a meeting of New York security analysts that the FCC's approval of tariffs for AT&T's Megacom and Software Defined Network in effect legalized bypass.

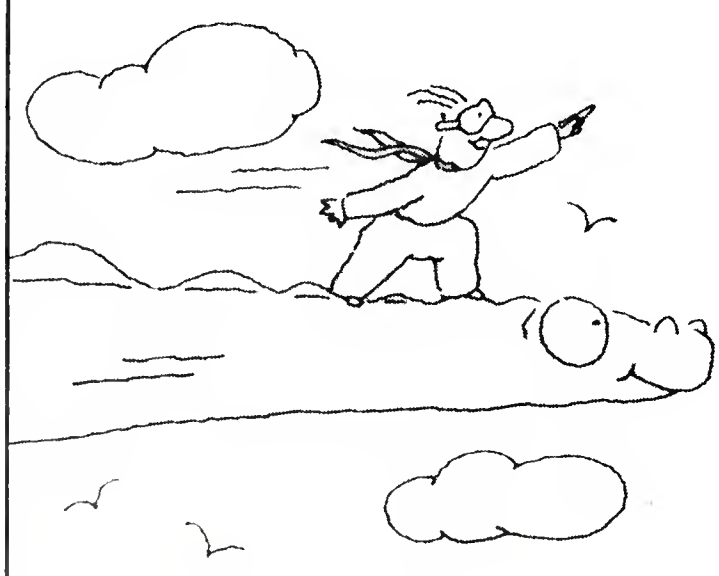
Megacom and Software Defined Network are services aimed at connecting large and small businesses directly to AT&T switches.

FCC theory overturned

Bolger said the FCC's theory — and the assumption of the divestiture that the local telephone company's control over the local exchange created a bottleneck — had been overturned, justifying removal of the restrictions on the regional holding companies to provide solely local-exchange telephone service.

Phil Campbell, president of Bell Atlantic Network Services, also said the company would file a petition in the next two weeks with the FCC, seeking relief from rules barring it from combining local telephone service with its marketing of telephone equipment.

If granted, the petition would provide relief similar to that recently granted to AT&T.



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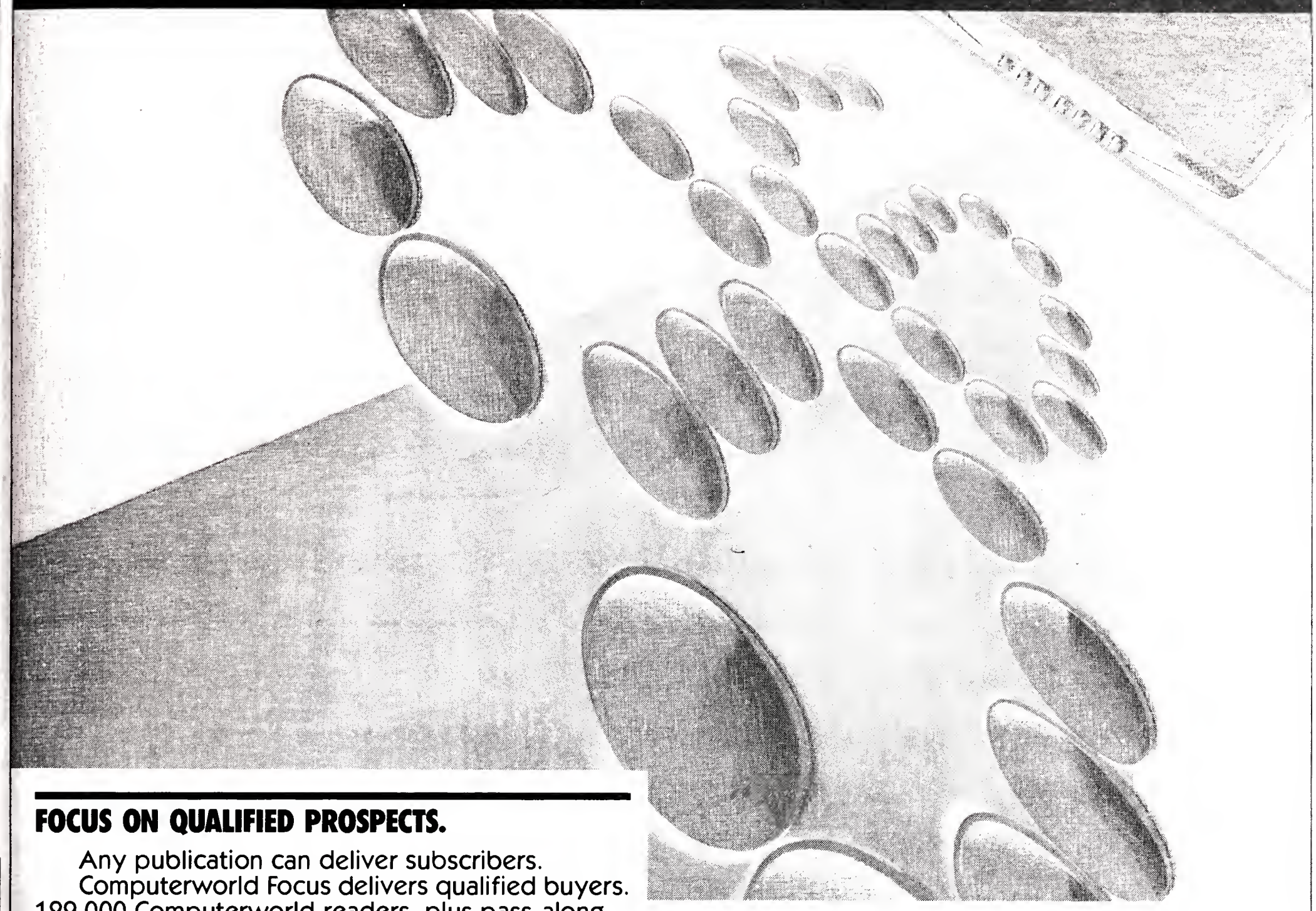

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For more information, contact Ed Marecki, Vice President/Sales, Computerworld Focus, 375 Cochituate Road, Framingham, MA 01701. Or call (617) 879-0700.

But hurry, the closing for the January 15th Communications issue is December 6th.

Computerworld Focus Topic	Issue Date	Closing Date*	Show Distribution
Communications	January 15**	December 6	Comnet
Software	February 19	January 10	
Manufacturing	March 19	February 7	Advanced Manufacturing
Microcomputing	April 16	March 7	Comdex/Spring '86
Office Automation	May 14	April 4	NCGA, NCC
Software	July 9**	May 30	PC Expo, Software Expo
Unix™	August 20**	July 11	Unix™ Expo
Communications	September 17	August 8	TCA
Office Automation	October 8	August 29	Info '86
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COMPUTER INDUSTRY

Smithsonian seeks financial support for computer exhibition

By Mitch Betts

WASHINGTON, D.C. — Officials from the Smithsonian Institution recently announced plans for a major museum exhibit on computer and communications technology to be opened in 1989 and have begun an unprecedented effort to raise $4.3 million from the industry to fund the project.

The 12,000 sq-ft exhibition hall will replace and dramatically expand the admittedly outdated computer exhibit now at the Smithsonian's National Museum of American History, officials said. More than five million tourists visit that museum every year.

"We at the Smithsonian propose to take the lead in helping the American people understand the origins and implications of information technology and the information revolution, which are affecting their lives," Smithsonian Secretary Robert McC. Adams said.

Adams and U.S. Rep. Norman Y. Mineta (D-Calif.) immediately began talking with representatives of such firms as IBM, Honeywell, Inc., AT&T, Burroughs Corp., NCR Corp., Texas Instruments, Inc. and Lotus Development Corp. to solicit funds, equipment and advice.

> *'We at the Smithsonian propose to take the lead in helping the American people understand the origins and implications of information technology.'*
>
> **— Robert McC. Adams**
> **Smithsonian Institution**

Adams said the Smithsonian would retain all control over the content of the exhibit and its messages to avoid any bias toward the contributing manufacturers.

Officials said the Smithsonian has thousands of historical items relating to information technology, including an original Hollerith punched card tabulating machine used for the 1890 U.S. census; the ENIAC electronic computer of 1946; the UNIVAC I and early compilers of the early 1950s used for general-purpose data processing; the IBM 650 of the mid-1950s; and the Altair 8800 of 1975, which launched the decade of personal computing.

But Adams and Roger Kennedy, director of the National Museum of American History, stressed that the exhibit will be more than equipment and labels. They said the exhibit will be interactive with computer terminals that answer inquiries and permit hands-on demonstrations.

Kennedy said the information will be presented at several knowledge levels, so the exhibit will be educational for novices as well as the computer literate.

Furthermore, officials said the exhibit will stress the social conditions that prompted the development of information technology, the personalities involved and the effects of computers on society.

The museum also hopes to keep the exhibit up to date by following the activities of research laboratories around the country, officials added. In a decade or so, the "Information Revolution" exhibit may be spun off into a full-fledged museum on information technology, they said.

Smithsonian officials denied that their project competes with The Computer Museum in Boston [CW, Oct. 14]. They said the Smithsonian has a friendly relationship with the Boston museum and that the two efforts are complementary.

"It belongs on the Mall in Washington," Adams said of the proposed computer exhibit.

"That doesn't mean [computer technology] doesn't belong in other science museums around the country, but this is a national responsibility," he said.

Lessons for the big boys

From page 137

overall demand rebounds, orders will go through the roof.

DEC does have the chance to prove Olsen right over the next couple of quarters, as the VAX 8600 and especially the Microvax II move into peak product cycle. But so far, while DEC's results have been favorable vis-a-vis its competitors, it has not surpassed year-earlier results. Most major industry players, most notably IBM, have not been able to do that in 1985.

That is just the point. There are a lot more factors that drive computer demand than the latest technological wizardry, even with a product as impressive as Microvax II or as long anticipated as Sierra.

Twelve months ago, it might have been hard to convince the high-flying computer industry of that. But after three or four quarters of industry news ranging from slower growth rates to devastating losses, the lessons should have been learned. For a long list of reasons technology does not sell itself anymore.

DEC's new products have given the firm modest success in 1985; IBM is banking on Sierra — and its patchwork quilt of price cuts and price increases — to deliver a brighter fourth quarter. But these successes will be relative to the overall condition of an industry whose best days are behind it.

That is not, however, a picture of gloom. There will be plenty of future growth in the computer industry, and there will indeed be companies, with the right combination of niche, product and marketing, that will double or triple quarterly earnings from year to year.

But the computer industry has turned a major corner in 1985. IBM and DEC may not be facing the same type of challenges as Control Data Corp., Wang Laboratories, Inc. or Data General Corp., but they, too, must live in a postboom, maturing computer business world. The companies that recognize the limits of that world after a year of turmoil and shakeout are the companies best prepared to prosper within it.

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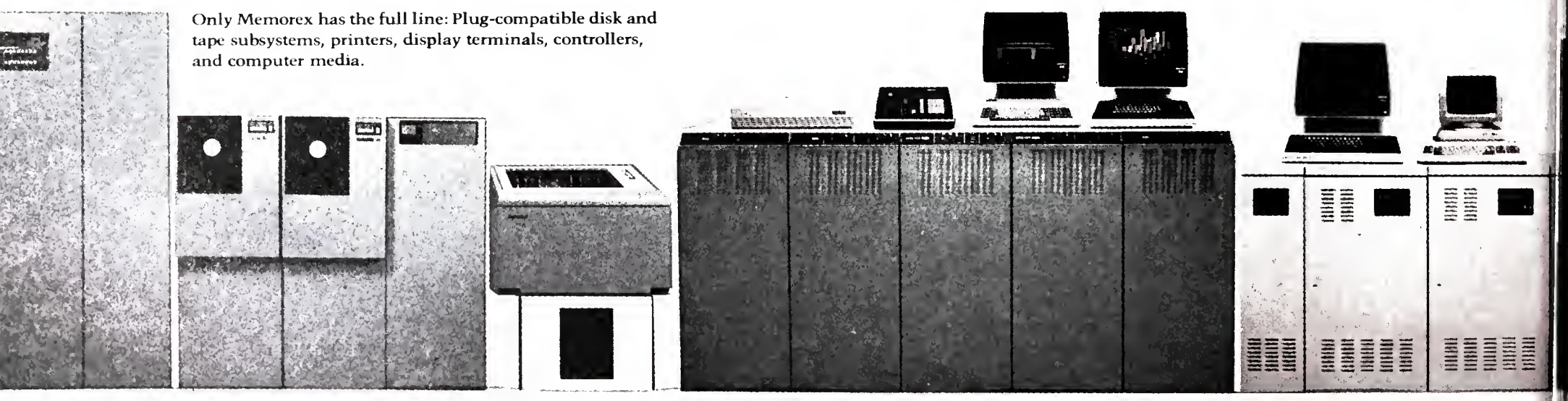

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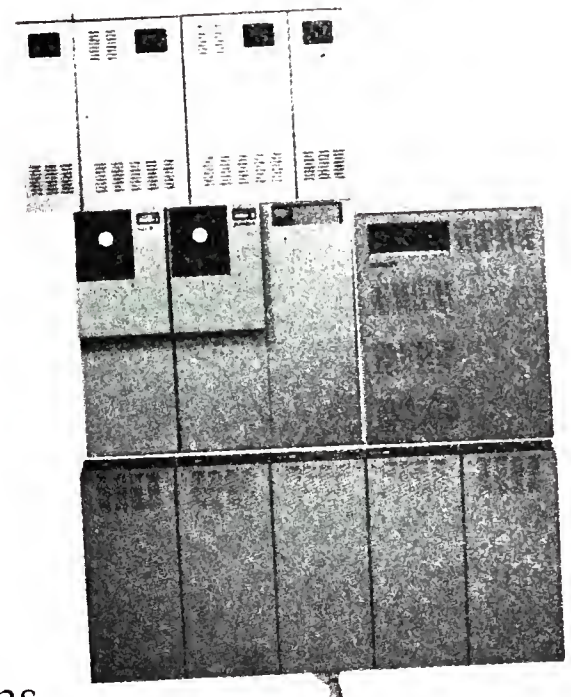

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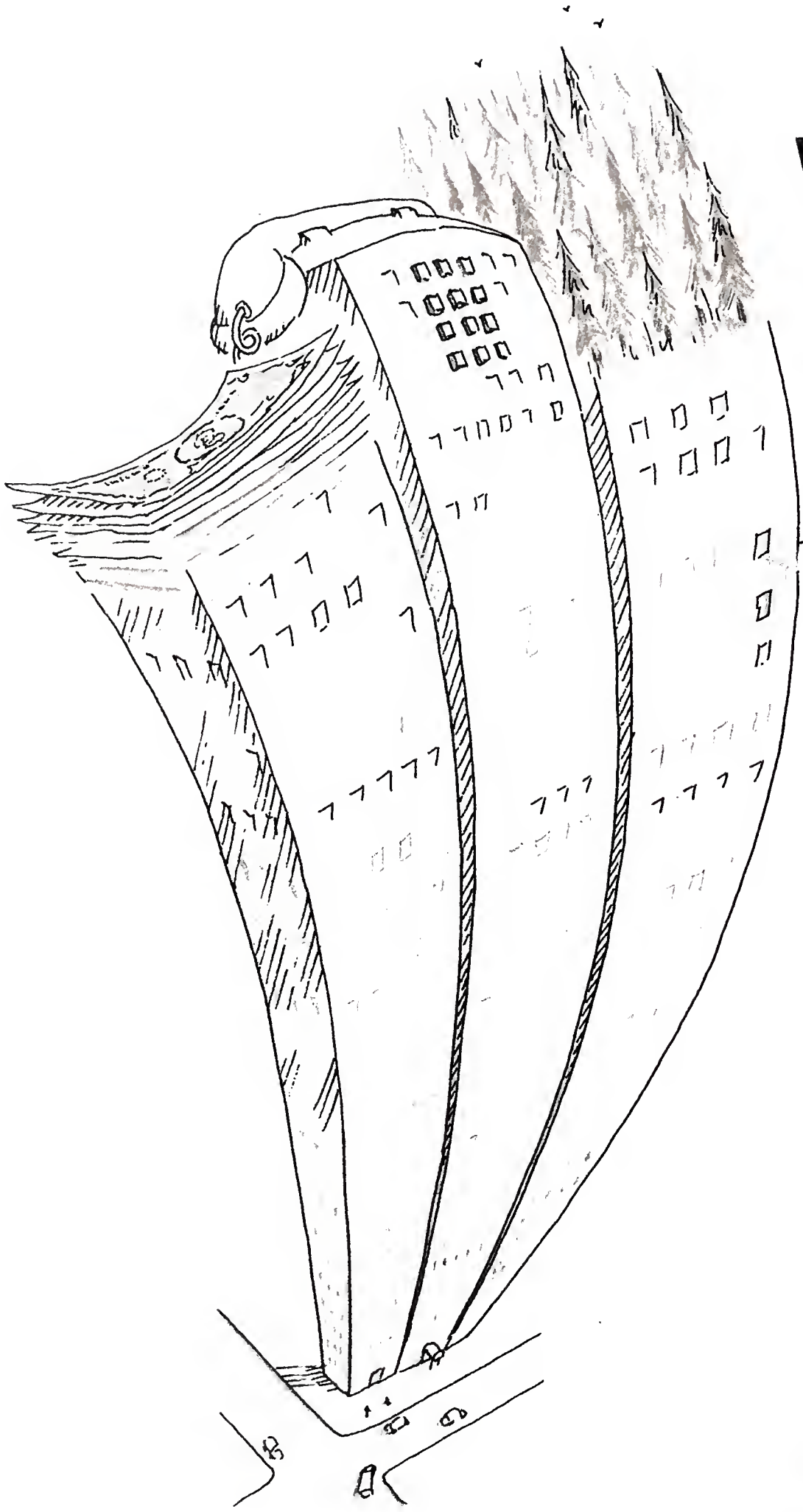

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Disclaimers may not protect vendors from suffering liability

OUTSIDE LINES
L. J. Kutten

It seems everybody in the computer industry is putting disclaimers and limitations of liability on products regardless of whether the product needs it.

I recently received a book from Scott Foresman and Co. titled *Microsoft Basic Programming for the Mac.* It contained a "Notice of Liability" that stated neither the author nor Scott Foresman "shall have any liability to [the] customer or any other person or entity with respect to any liability, loss or damage, caused or alleged to be caused directly or indirectly by the programs contained herein. This includes . . . loss of business or anticipatory profits or consequential damages from the use of the programs."

And what kind of book could cause such losses? According to the author, it was a beginner's book in Basic programming. While it contained a multitude of short programs that explained fundamental concepts of Basic programming techniques, there was nothing in the book or programs that could cause either the author or publisher to suffer liability.

Not alone in disclaimer use

Scott Foresman is not alone in using disclaimers. They can be found in books and software regardless of their nature or complexity. I even heard of a disclaimer in an educational program designed to teach preschool children to recognize numbers and letters.

Why computer vendors use these disclaimers on all their products is beyond comprehension. Contrary to public opinion, in many instances, the disclaimer or limitation of liability is not worth the paper it is written on in the event litigation occurs.

First and foremost, a disclaimer has no effect on an express warranty. All too often vendors assume an express warranty can only be created by them making an express promise to a buyer. They are mistaken. A statement of fact made in an advertisement, an instruction manual and so forth is an express warranty. Take the case of Consolidated Data Terminals vs. Applied Digital Data Systems, Inc.

Speed not up to claims

The defendant marketed the Regent 100 terminal with advertised specifications of 19.2K bit/sec. The terminal could not work at that speed, and the specification was lowered to 1,900 bit/sec. When sued, the defendant argued that "the warranty disclaimer clause incorporated into each . . . contract negatives any other . . . promises contained in oral or written descriptions of the goods or in promotional literature." The court disagreed. Since the statements regarding the terminal's 19.2K bit/sec. capability were an express warranty, they could not be disclaimed as a matter of public policy.

Second, a limitation of liability has no effect if it fails its essential purpose. Assume the contract says the vendor shall repair or replace the defective software or hardware, and he is unable to. In such event the limitation fails. In RRX Industries vs. Lab-Con, Inc., the defendant agreed to provide a working medical laboratory software package for $40,867.

When it failed to correct the bugs, it was sued. The court disregarded a contract provision limiting damages to the amount of the contract and awarded additional damages of $6,364 for overtime spent by the plaintiff trying to get the software to work and $1,142 for additional costs.

Finally, vendors should be aware that the doctrine of unconscionability limits their ability to contractually limit their liability. In recent years a trend has appeared in computer cases where the court examines the parties relative computer sophistication rather than their commercial sophistication.

Two cases

This trend is clearly seen in two cases, The Glovatorium, Inc. vs. NCR Corp. and Horning vs. Sycom.

In Glovatorium, the plaintiff was a small first-time computer user. It purchased an NCR Spirit/8200 computer system to do routine accounting.

The system failed to work, and Glovatorium sued NCR. The jury awarded compensatory damages of approximately $225,000 for intentional misrepresentation, $50,000 for breach of warranty and $2 million for punitive damages.

NCR defended on the grounds that the contracts contained disclaimers and limitations of liability. The trial court felt otherwise. It said that "if there is ever a reason for a holding

See **DISCLAIMERS** on page 157

Kutten is a member of the Missouri and Illinois bars and author of The Computer Buyer's Protection Guide, *published last year by Prentice Hall, Inc.*

DEC's IBM micro coming

From page 137

tion," he said. "If the economy is down, we'll gain a bigger market share; if it goes up, we'll do a higher volume. So we don't care either way."

But he acknowledged that DEC would fall short of its stated goal of a 22% return on stockholders' equity — which it has never reached — if economic doldrums continue. "It is a big challenge," he said. "With the products we have, we should have a simple set of components that will allow us to reach those goals. But we have to get our message across and exploit the technology we have now and the technology on the way."

Olsen said DEC has shipped about 1,000 of its VAX 8600 high-end superminis to date, and that greater than anticipated demand for the Microvax II has resulted in a six- to eight-week wait for orders. He said the microprocessor-based machine has cut into sales of older, more expensive VAX-11/730s and VAX-11/750s, as expected. "The plan was to wipe them out eventually," he said.

Olsen downplayed the significance of Data General Corp.'s forthcoming MV/20000, which DG will position against the 8600 with a higher million instructions per second (MIPS) rating. "MIPS is a strange game," Olsen said. "Software, not hardware, makes the real difference in speed. We aim not for a specific number [of MIPS] but for usefulness. That's what our customers want, and that's what we have. A few MIPS either way is not that important."

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Business notes

From page 137

jump from September was the highest month-to-month increase since February.

Association President Thomas Hinkleman said the figure represented an across-the-board improvement in orders for most categories of chips. Combined with a recent increase in distributor orders, Hinkleman said, the ratio indicates "a modest upturn in business for the near term."

Monthly orders for the three-month period ended in October were $506 million, an 8% increase from the previous three-month period but a 36% decrease from the year-earlier period.

The October book-to-bill ratio indicated that chip makers received $82 worth of new orders for every $100 in orders shipped.

■

Tandon Corp. has landed H. L. Sparks as its new senior vice-president for sales and marketing. In the past, Sparks headed successful sales organizations for the IBM Personal Computer and for Compaq Computer, a company Sparks has been with since 1983, most recently as vice-president of sales of Compaq Telecommunications Corp.

He spent 20 years at IBM, ending his Big Blue career as director of sales and service for the Personal Computer and as a member of the Personal Computer management team.

■

Despite a 156% gain in revenue, Trilogy Ltd. reported a 34% greater loss for its third quarter compared with year-earlier results. The beleaguered Cupertino, Calif.-based venture of Gene Amdahl posted a $7.1 million, 20-cent-per-share loss, compared with a loss of $5.3 million, or 14 cents per share, a year ago. The recent loss included a one-time charge of $4 million, or 11 cents per share, for discontinued development activities.

Revenue rose to $1.7 million from $662,000 in the third quarter of 1984. Most of Trilogy's revenue came from service contracts providing research and development on advanced systems interconnect and packaging technologies.

The third quarter included finalization of Trilogy's merger with Elxsi, a San Jose, Calif., supercomputer vendor.

Fourth-quarter and subsequent results for the two firms will be combined. In the third quarter, Elxsi lost $5.4 million on sales totaling $5.6 million.

■

Borland International's Turbo Pascal and Sidekick software received a potential boost recently when Borland signed a distribution agreement with IBM.

Big Blue will distribute the two low-priced IBM Personal Computer applications through its national accounts and national marketing divisions.

Worldwide data protection eyed

From page 137

"Both of these situations, in Japan and Hong Kong, illustrate the power of the technology to force a change in attitudes toward data protection," Westin said. "Both want to be a force in the worldwide data processing services industry, and both have developed a very positive idea that, in order to play in this market, they will have to enact standards governing the protection of data."

The conference on international information focused on the large multinational corporations that ship large volumes of data across borders without deterrence, while keeping within national data and privacy protection laws.

Peter Robinson, telecommunications advisor to the Canadian government, predicted that developing countries will move to assert some form of control over the intangible value of intracorporate data flow.

"There will be rules of the road for the transnational corporations, and there will be input from the corporations," said Robinson, who admitted there was a "lack of dialogue" between the developed countries and the developing countries.

"U.S. companies engaged in overseas business are simply unaware of the problem, in the main," according to Burnes Hollyman of the accounting firm of Peat, Marwick, Mitchell & Co. He said the lack of interest typifies the attitude in most organizations that communications and information are not part of the strategic assets of the company.

While data protection laws are being enacted by many countries that have previously been content with none, the sensitivity of data protection has assumed an economic and political importance in trade relations in Europe and the U.S. The foreign ministers of Europe, Japan and the U.S., comprising the Organization for Economic Cooperation and Development (OECD), recently added the issue of barriers to trade in services to their international trade agenda.

In the past, U.S. firms with offices in Europe have faced the possibility of national telephone administrations measuring the volume of intercontinental data transmitted on their private telecommunications lines.

Last April, the OECD adopted for the first time a declaration on transborder data flows that acknowledges the growing interdependence of the international information economy on their countries.

The OECD's transborder data flow subcommittee recently decided to study intracorporate data flows as one of its three main areas of concern, a decision denounced by the U.S. Computer and Business Equipment Manufacturers Association.

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States going on-line with criminal data

WASHINGTON, D.C. — Thirty-five states now have computerized criminal records, and the trend toward automation is continuing at a steady pace, according to studies by the U.S. Bureau of Justice Statistics.

"I am pleased that the state administrators [responding to the bureau's survey] report a significant and continuing improvement in the completeness and accuracy of their data bases," commented Steven R. Schlesinger, the bureau director.

"Effective crime-control measures depend heavily on the accuracy of criminal records," Schlesinger said. "We ought to be able to identify dangerous offenders at key decision points in the criminal justice system, for example, at pretrial release hearings and at sentencing," he added.

The bureau noted that nine years ago it had urged states to establish centralized criminal-history record centers; currently, all states have either done so or granted authorization for them, the bureau reported.

The bureau, part of the Department of Justice, said the findings are contained in two reports, NCJ-99017 and NCJ-93926.

— Mitch Betts

VDT educators air guidelines

By Mitch Betts

WASHINGTON, D.C. — The Center for Office Technology, a VDT education organization funded by computer vendors and users, recently released a set of guidelines designed to help employers provide VDT operators with a safe, comfortable and productive workstation environment.

The guidelines offer suggestions about adjustable workstations, lighting that reduces glare, vision care, alleviating the health concerns of pregnant employees, work breaks and exercises and the need for employers to provide a continuing flow of information about VDT work to all operators.

The center said it will distribute the three-page document to U.S. business leaders. "Appropriateness of these guidelines for specific work situations will vary, but we believe voluntary support of these principles by employers will benefit both employees and employers," commented Renee Ross, executive director of the center.

The center, along with the Computer and Business Equipment Manufacturers Association, has lobbied against government-mandated VDT standards.

Convergent invests in Baron

By Maura McEnaney

SAN JOSE, Calif. — Soon after the resignation of founder and Chairman Allen Michels and three other key employees, Convergent Technologies, Inc. announced plans to purchase 40% of systems integrator Baron Data Systems of San Leandro, Calif.

The $14.6 million investment gives Convergent two seats on the board of directors at Baron; however, the deal restricts any further investment in the company for three years. At that time, Convergent can make an offer to buy out the remainder of the shareholders, Baron said.

Convergent President Paul Ely told a group of financial analysts that the company intends to "build a federation of companies in selected vertical markets." Baron is the first of those companies, specializing in turnkey systems for the legal and medical professions. Baron's revenue for the six months ending Sept. 30 was $10.4 million, and profits were $400,000.

Convergent third-quarter revenue was $101.6 million, down slightly from $101.6 million a year ago.

OTA endorses privacy act

By Mitch Betts

WASHINGTON, D.C. — The U.S. Congress' Office of Technology Assessment (OTA), in a recent report, endorsed the Electronic Communications Privacy Act of 1985, a pending legislative proposal designed to outlaw the interception of data communications and electronic mail.

In a report titled "Electronic Surveillance and Civil Liberties," the OTA agreed with sponsors of the legislation that current federal law does not protect such communications. The OTA report said the major policy option available to Congress is to amend the federal wiretap law to give electronic messages the same privacy protection as phone calls.

The Electronic Communications Privacy Act of 1985 is sponsored by Sen. Patrick J. Leahy (D-Vt.) and Rep. Robert Kastenmeier (D-Wis.), with the support of the Electronic Mail Association and others [CW, Sept. 30].

The OTA report also expressed concern about the possibility of what it called data base surveillance. "As computerized record systems and data communications linkages become widespread, the potential for computer-based surveillance of the movements and activities of individuals also increases," the report stated.

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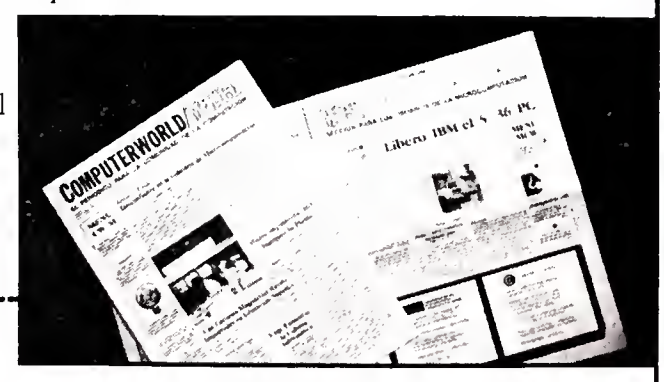

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Japanese insider on IBM, NTT

From page 1

ful domestic companies.

What does IBM stand to gain?

From the IBM side, their missing link is obviously telecommunications. They have now matched with Rolm Corp. and are very aggressively pursuing the telecommunications market. So technology and human resources from NTT would be very attractive to IBM.

The NTT-IBM deal appears to have happened so quickly. How long had you been laying the groundwork?

Though NTT was privatized on April 1 of this year, we have actually been preparing for this kind of liberalization of telecommunications for at least a year. First we planned on how to handle the liberalization of the value-added network market.

Is the definition of value-added network in Japan different from that in the U.S.?

In the U.S., the value-added network is usually a product of a reseller who adds value to a network and resells the lines rented from common carriers. In Japan, this type of network has much wider coverage, such as remote computing services.

In the U.S. and Europe, IBM dominates the computer market, but in Japan, IBM has only 28% of the computer business. NEC Corp., Fujitsu Ltd. and Hitachi Ltd. together have a 57% or 58% market share.

So, if you want to be in the value-added network business in the U.S., you can support an IBM interface — 3270 or other of their protocols — and cover 65% to 70% of the market. But if you want to do the same thing in Japan, you have to consider IBM evenly along with these three other companies.

Also, Japanese customers, especially in the big corporations, want a standardized network because they can't deal with a single vendor. The situation is so complicated that they have to think about the balance among the suppliers.

So why did NTT make this IBM deal?

We thought it neccessary to deal with at least these four companies to have the most effective and useful value-added network in Japan. We started this effort in November of last year and talked to executives of all four companies.

In the beginning, we had a fairly good reaction from all four companies. But after Mr. Takeo Shiina [president of IBM Japan] consulted with IBM's Asia/Pacific Group, we got a negative answer. The group's major concern was that if IBM Japan established a joint venture with the other three major mainframe makers, it might infringe on the antitrust laws. So the answer was, "Why don't you have a joint venture for value-added networks only with IBM?" We turned down that counterproposal.

What was wrong with that offer?

IBM has only 28% of the market in Japan, so we couldn't do that. But during our negotiations with them, we got the feeling that — although it was very difficult for IBM Japan to invest directly into a joint venture — if IBM and NTT had some other kind of formation, IBM Japan could invest into the value-added network company through that subsidiary. So we began talking to find out the appropriate subject for a joint undertaking.

Where did those talks lead?

We found the best product with which to do something jointly was the DCNA-SNA combined technology. Since December 1983 we have been conducting joint research with IBM to converge their Systems Network Architecture into NTT's Data

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Communications Network Architecture. DCNA is the standard network activity in Japan. We got the information from our laboratory that the product would be ready to go commercial by March of 1986. So we thought it was the right time to have a joint venture.

So the venture was done entirely at NTT's initiative?

I would say both. Dr. Hisashi Shinto, NTT president, and Mr. Shiina of IBM are very good friends. On many occasions they talked about general business, and it's also true that both were pursuing some kind of joint architecture.

And which company gets to manage this new business?

The president of this new company will be from NTT and the vice-president from IBM Japan.

Who will control IBM's side of the deal, IBM Japan or IBM in Armonk, N.Y.?

So far, it looks like IBM Japan will be in charge of the business. But if you are familiar with IBM's management style — the various strategies, pricing policies, the terms and conditions — all the major issues belong to the headquarters in the U.S.

Can two large companies from different countries cooperate like this?

I don't think it will create a problem, although it's true that there are many differences between the companies' corporate cultures. But I my-

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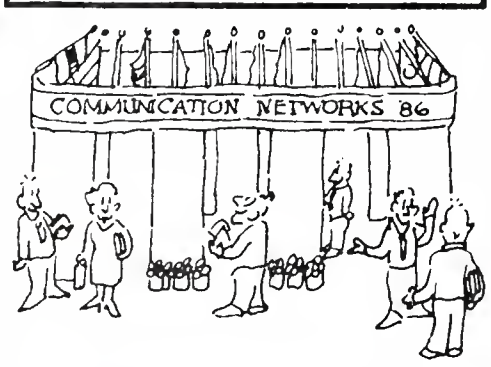

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self have been involved in this deal for more than eight months. We faced many differences. My feeling is that we have a strong and determined mind; we can conquer anything.

Is the NTT management style very different from IBM's?

Yes, it's very different. We were formerly a government organization.

Can you comment on technologies that will come out of this deal?

The SNA-DCNA connection will be very important. But IBM still has the mentality that their world is the whole world. They don't like to interconnect to the other networks. But they can learn something from the Japanese market. Japan is truly a multivendor environment — so that will feed back to the strategy of IBM's head office and may have a very good effect for the whole operation of IBM. But we don't know. It's too early to tell.

The venture has set off criticism regarding monopoly and antitrust. How are you dealing with this?

So far, the reaction from Japanese companies is very emotional. We didn't announce the anticipated revenue for the next five years. But some of the preliminary numbers were divulged intentionally. For example, people know the revenue in 1990 will be around $400 million. If you think about the whole value-added network market in Japan, it will exceed $6 billion. So $400 million out of $6 billion — who could say it's domination or monopoly? But people are surprised by the number $400 million.

They think it's too much?

Most people think it's very big. It may be true, the whole market is currently $3 billion, so $400 million in five years looks very quick. But the market itself is now growing 20% per year or more. So, our estimation for the next five years is very moderate. I think it's curious to see the very strong reaction.

But you are two huge forces in the business, and the implications of the agreement are enormous.

Most of the major companies — say, the 40 biggest companies in Japan — usually buy the product and construct systems by themselves. But now, because of the increasing complexity of systems, they can't handle it by themselves. They are asking NTT to figure out the incompatibility. So our deal with IBM is basically aiming to satisfy and cope with the demand from existing customers.

Will you be buying more products from IBM because of this deal?

Yes, we want to purchase a lot more of IBM's products. We decided to purchase the new Sierra for software development. We are going to buy the IBM 5550, which is the version of the IBM Personal Computer in Japan. And we are very interested in the System/38, which is very nice.

Where will the major business for this new venture come first, inside or outside Japan?

Inside Japan. It's obvious.

We already have two orders from major city banks to do joint development activity with the new joint venture.

Disclaimers may not aid vendors

From page 151

that these provisions in these contracts should not be enforced because of unconscionability, this is the A No. 1 case." It noted that NCR had targeted "businesses that have never used computers before, who do not have any experience with them, and didn't know the consequences are of a defect and failure . . . to provide . . . adequate support." Since the company was dealing with a first-time computer user, NCR was under a special obligation to be fair in dealing with the user.

In Horning, the plaintiff challenged the forum selection clause in a software licenses agreement as unconscionable. The plaintiff was a solo practitioner dentist in a small Kentucky town who purchased a Tandy Corp. microcomputer. The licensed software was supposed to be able to assist him in compiling financial data, tax records, patient records and so forth.

After the system failed to operate, Horning filed suit in Kentucky for breach of contract, breach of warranties, negligence and fraud. The defendant attempted to remove the case to Wisconsin under the forum selection clause of the contract. In denying the defendant's motion, the Kentucky court stated:

"While the court cannot say that the defendant has engaged in overreaching, it does regard the clause as bordering on unconscionability as applied to the sale of an important piece of office machinery to a small businessman for the substantial purchase price. In the opinion of the court, there was a disparity of bargaining power with regard to the particular clause of the contract in questions."

The court further noted that "the forum selection clause is only one of many clauses in the sales contract that together represents the best job of boiler-plating since the building of the Monitor."

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The appointee may qualify for a tenure track appointment in one of the academic departments. The appointee must evidence proven capabilities for successfully exercising the duties of the position. This may include such qualifications as experience as manager or director or equivalent of a multidisciplinary computing center in an academic or research environment, extensive personal experience in such settings, demonstrated ability to identify and activate sources of external revenue to help support University computing facilities, and ability to work with a diverse population to carry on the development of an outstanding computing facility. A proven background of extensive experience in operating systems, data communications, user support, budget management and vendor negotiation will be preferred.

The salary will be commensurate with experience and qualifications. The position will be filled at the earliest mutually agreeable time.

Nominations should be received by December 15, 1985. Applications must be received by January 15, 1986 to be assured of consideration, must include a current vitae and the names, addresses, and telephone numbers of at least three references, and are to be sent to: Dean Robert M. Johnson, Graduate Studies and Research, Florida State University, 408 Westcott, Tallahassee, Florida 32306.

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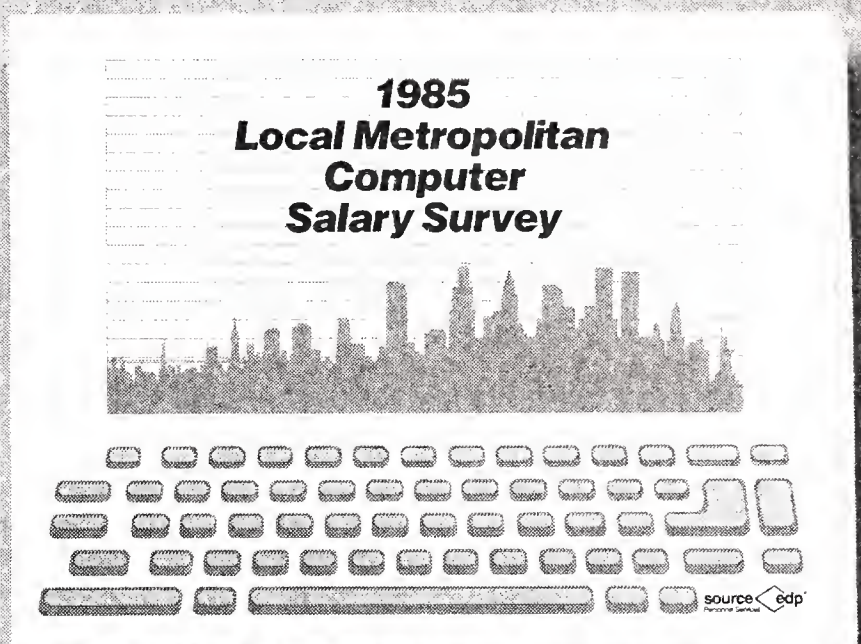

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Scientific Programmer/Analyst II
Needed by Campus Computer Center. Bachelor's degree in a specific scientific field is necessary, with preference for a degree in Computer Science or Electrical Engineering. Two to three years experience in scientific programming/analysis, proficiency in the use of at least two computer languages (one of which must be scientifically oriented), and familiarity with computer algorithms necessary to solve complex scientific problems are required. Desirable qualifications include experience on a Data General MV 10,000 running AOS, experience or training in image processing and signal processing, and strong FORTRAN programming skills. Salary range: $19,790 - 27,000.

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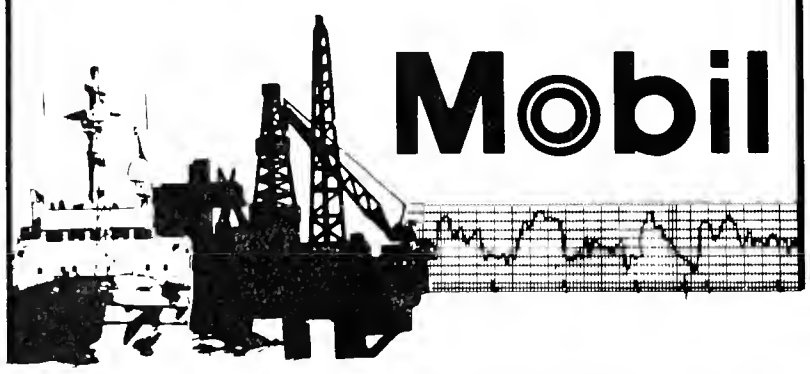

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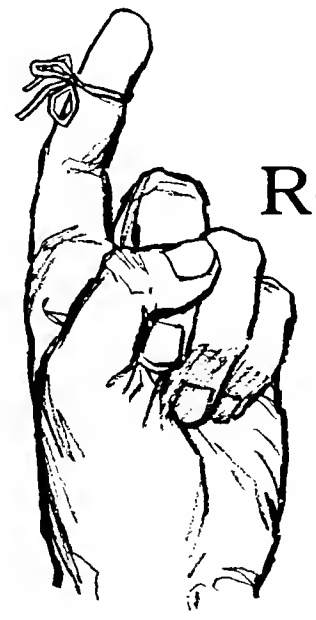

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Starting salaries are fully commensurate with experience and are accompanied by an excellent benefits package. For prompt consideration, please direct your resume and salary requirements to:

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AA/EOE

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INTERGRAPH

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The position is based in Socorro, New Mexico. Occasional travel to the antenna sites may be required. For consideration please send resume and salary requirements to: **D.L. Swann, NATIONAL RADIO ASTRONOMY OBSERVATORY, P.O. BOX O, Socorro, New Mexico 87801-0387**

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GTE Data Services

XEROX

Job Update

Business Systems Group

Where Careers Get Growing

Xerox Business Systems Group, a leader in the Office Systems and Electronic Printing Systems industries is growing. That means immediate opportunities for experienced professionals, all over Southern California. The following positions are available in San Diego, Orange County, the San Fernando Valley and the greater Los Angeles basin:

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Ambitious, aggressive individuals with at least 3 years direct sales experience in the data processing, word processing and/or distributed information industries. You should have a BS in a business discipline. Computer science or management information systems preferred.

Systems Analysts/Office Systems

You will conduct feasibility studies and provide technical and applications support. This is a key role in the marketing of Xerox systems. You should have at least 3 years experience working with office systems, data processing and/or electronic printing systems, with some application design and development experience. Data communications/telecommunications experience preferred. You should have a BS in computer science or management information systems.

Systems Analysts/Printing Systems

Future-minded professionals to travel extensively, providing comprehensive customer support. Duties include the training and development of customer systems personnel; business applications with emphasis in the DP area; and working with team members in the preparation and presentation of sales materials. You should have a BS degree, plus 5 years experience as an analyst. Your background should include familiarity with large mainframe operating systems, and experience in systems analysis, project management or customer support.

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Or send your resume with earnings history to: **L. Olmos, Xerox Corporation, Business Systems Group, Dept. CW1118, 16755 Von Karman, Irvine, CA 92714.** Xerox is an equal opportunity employer.

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The preferred candidate will have an appropriate Master's degree and three years experience working with a higher education management-information system. Salary is competitive. Women and minorities are encouraged to apply. Send letter, resume, transcripts and three letters of reference by December 15, 1985 to Dr. Donald R. Mathieu, Acting Provost, SUNYCO, Oswego, New York 13126.

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POSITION ANNOUNCEMENTS

Systems Analyst

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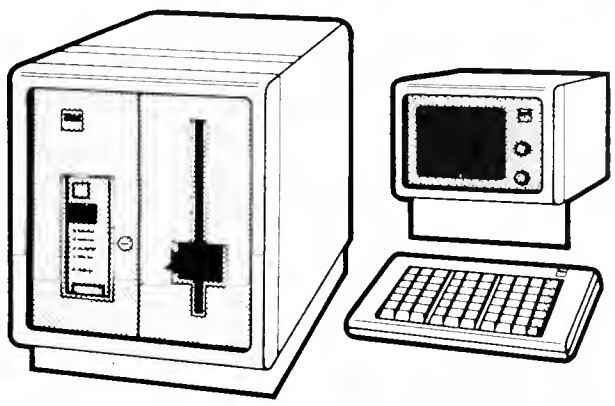

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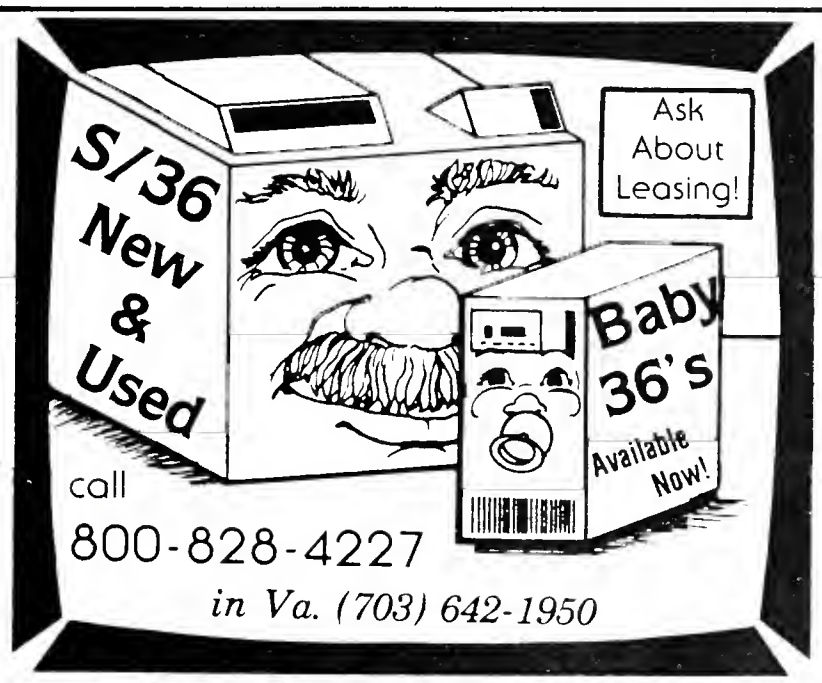

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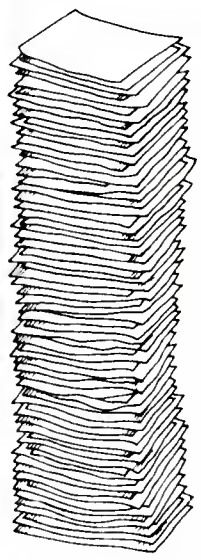

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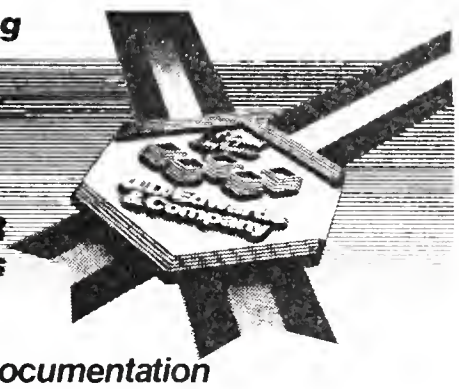

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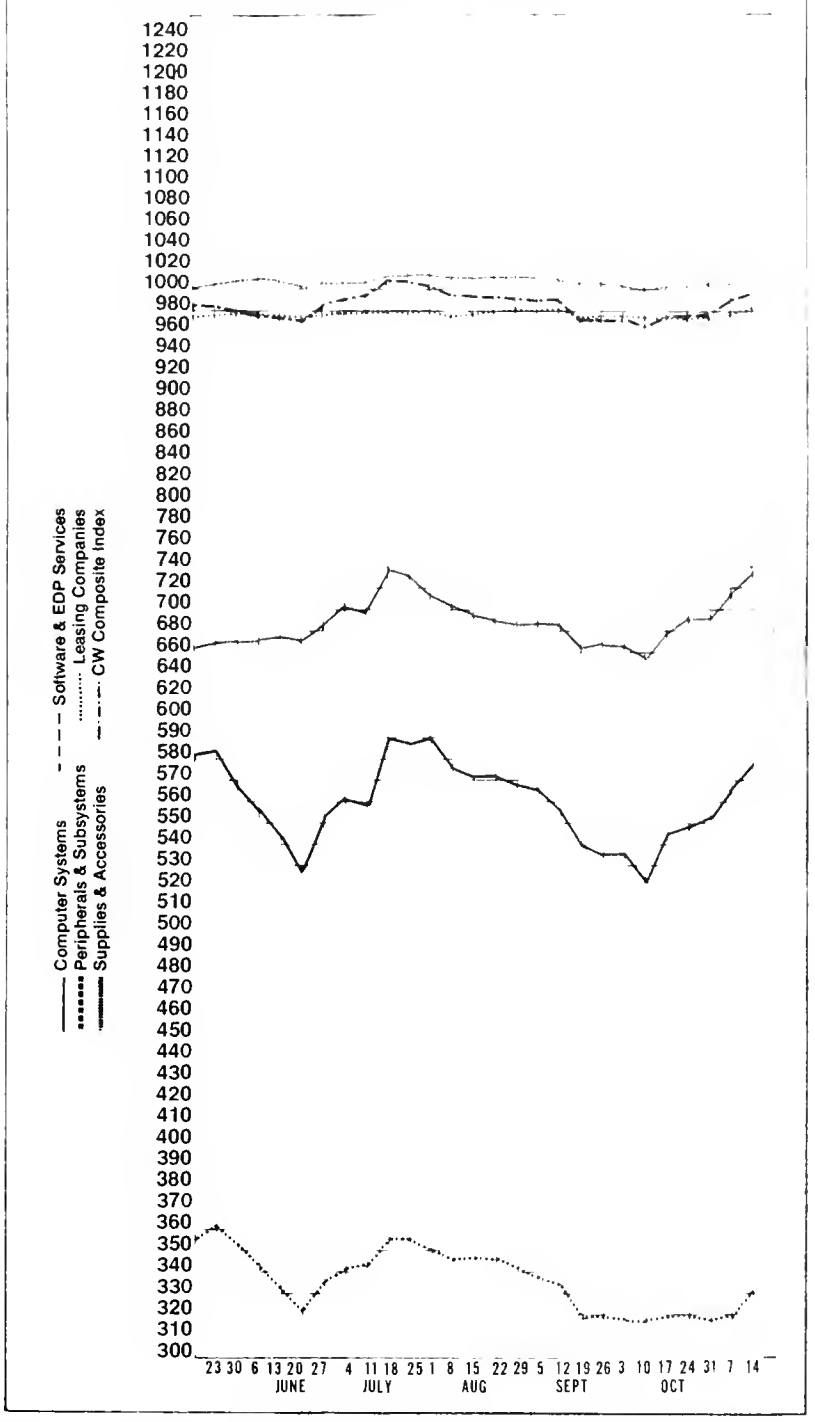
Computerworld Stock Trading Index



Computerworld Stock Trading Summary

TRADE*QUOTES

CLOSING PRICES WEDNESDAY, NOVEMBER 13, 1985

E		PRICE 1985 RANGE (1)	PRICE NOV 13 CLOSE	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	5- 12	5 1/2	- 1/4	-4.3
O	ALTOS COMPUTER SYST	7- 14	11 1/2	+ 1/2	+4.5
A	AMDAHL CORP	10- 19	11	0	0.0
O	APPLE COMPUTER INC	14- 31	18 3/8	+ 1/8	+0.6
N	AT&T	18- 25	21 5/8	+ 7/8	+4.2
N	BURROUGHS CORP	51- 66	58 1/4	+ 3/4	+1.3
O	COMPAQ COMPUTER CP	4- 12	10 1/2	+ 1/4	+2.4
O	COMPUTER AUTOMATION	3- 9	4 1/4	0	0.0
A	COMPUTER CONSOLES	5- 20	6 1/4	- 1/8	-1.9
N	CONTROL DATA CORP	16- 39	17 7/8	+ 1/4	+1.4
O	CONVERGENT TECHNOL	5- 17	8 5/8	+ 1/8	+1.4
O	CPT CORP	5- 12	5 5/8	+ 1/8	+2.2
N	CRAY RESEARCH INC	23- 62	61 7/8	+4 5/8	+8.0
O	DAISY SYSTEMS CORP	21- 38	26	+1 1/4	+5.0
N	DATA GENERAL CORP	31- 76	44 1/8	+2 1/2	+6.0
N	DATAPOINT CORP	5- 23	5 1/2	+ 1/8	+2.3
N	DIGITAL EQUIPMENT	85-126	116 5/8	+1	+0.8
A	EECO INC	12- 16	15 5/8	+ 1/8	+0.8
N	ELECTRONIC ASSOC.	3- 6	4 3/4	+ 5/8	+15.1
N	FLOATING POINT SYST	15- 35	33	+1	+3.1
N	FOXBORO	24- 34	24 7/8	0	0.0
N	GOULD INC	20- 34	32	- 5/8	-1.9
N	HARRIS CORP	23- 35	26 1/8	+ 7/8	+3.4
N	HEWLETT-PACKARD CO	30- 44	32 3/4	+ 1/2	+1.5
N	HONEYWELL INC	53- 67	64 3/8	+1 1/8	+1.7
N	IBM	116-138	135	+2 1/8	+1.5
O	IPL SYSTEMS INC	1- 4	1 1/2	0	0.0
N	ITT CORP	24- 37	33 7/8	+ 1/2	+1.4
N	M/A-COM INC	13- 24	13	-3 1/2	-21.2
N	MANAGEMENT ASSIST	2- 29	3 1/4	+ 1/8	+4.0
N	MATSUSHITA ELEC(ADR)	49- 66	55 5/8	-2 1/8	-3.6
N	MODULAR COMPUTER SYS	6- 10	5 7/8	+ 1/8	+2.1
N	MOHAWK DATA SCI	2- 15	1 5/8	- 1/8	-7.1
N	MOTOROLA INC	28- 44	33 3/4	+ 3/4	+2.2
N	NAT'L SEMICONDUCTOR	10- 17	11 3/8	- 1/4	-2.1
N	NBI INC	11- 21	13 1/2	+1 5/8	+13.6
N	NCR	23- 37	36 5/8	+1	+2.8
N	PERKIN-ELMER	22- 30	27 3/8	+2 1/2	+10.0
N	PRIME COMPUTER INC	15- 20	19 1/4	0	0.0
N	SPERRY CORP	35- 59	49	+2	+4.2
O	STRATUS COMPUTER INC	8- 21	21	+1 1/4	+6.3
O	TANDEM COMPUTERS INC	14- 29	16 1/2	+1	+5.7
N	TANDY CORP	24- 38	36 1/2	-1 5/8	-4.2
O	TELEVIDEO SYSTEMS	2- 7	2 3/4	0	0.0
O	TELXON CORP	7- 19	19 1/4	+1 3/4	+10.0
N	TEXAS INSTRUMENTS	86-148	95 3/8	+ 5/8	+0.6
A	ULTIMATE CORP	8- 24	14 1/2	+1	+7.4
O	VECTOR GRAPHICS INC	0- 1	1/4	+	+14.1
A	WANG LABS "B"	15- 32	18 3/4	- 1/2	-2.5
A	WANG LABS "C"	15- 32	18 7/8	- 3/8	-1.9
N	XEROX CORP	47- 56	55 7/8	+2 5/8	+4.9
	LEASING COMPANIES				
N	COMDISCO INC	8- 24	23 3/4	+1	+4.3
O	CONTINENTAL INFO SYS	5- 13	13 3/8	+ 1/2	+3.8
O	FINALCO GROUP INC	3- 7	3 3/4	- 1/8	-3.2
O	PHOENIX AMERICAN INC	2- 8	2 1/2	+ 3/8	+17.5
O	SELECTERM INC	7- 14	6 3/4	0	0.0
N	U.S. LEASING	32- 43	36	+1 1/4	+3.5
	COMPONENTS				
N	ADVANCED MICRO DEV	23- 41	25	+ 1/4	+1.0
O	ADV'D SEMICONDUCTOR	8- 25	9 1/2	- 1/2	-5.0
N	ANALOG DEVICES INC	16- 25	21 1/2	+1 1/8	+5.5
O	ANALOGIC CORP	9- 16	12 7/8	+ 5/8	+5.1
N	APPLIED MAGNETICS CP	8- 16	14 5/8	+1 5/8	+12.5
O	HADCO CORP	3- 10	4 1/8	- 1/4	-5.7
O	MICRO MASK INC	6- 14	5 7/8	- 1/8	-2.0
N	TERADYNE	18- 35	20 1/2	+ 1/2	+2.5
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 4	3 7/8	0	0.0
N	ADVANCED SYSTEMS INC	9- 20	13 1/4	- 7/8	-6.1
N	AGS COMPUTERS INC	10- 18	17 7/8	+1 1/2	+9.1
O	AMERICAN SOFTWARE	7- 15	9 1/2	+ 1/8	+1.3
N	ANACOMP INC	1- 4	2 5/8	- 1/8	-4.5
O	ANALYSTS INTL CORP	5- 11	8 1/2	+1	+13.3
N	APPLIED DATA RES	17- 40	21 1/4	+1 1/4	+6.2
O	ASHTON TATE	6- 14	14	+ 7/8	+6.6
O	ASK COMPUTER SYSTEMS	8- 24	11 1/8	0	0.0
O	ASTRADYNE COMP IND	1- 7	1 3/4	0	0.0
N	AUTOMATIC DATA PROC	38- 58	55 5/8	+2 3/8	+11.1
N	COMPUTER ASSOC INTL	18- 38	27	+2 1/8	+11.1
O	COMPUTER HORIZONS	5- 14	14 1/4	+ 1/8	+0.8
O	COMPUTER NETWORK	5- 10	5 3/4	- 3/8	-5.2
N	COMPUTER SCIENCES	12- 29	28 7/8	- 1/8	-0.4
E	COMPUTER TASK GROUP	10- 21	21 1/4	+1 1/4	+6.2
O	COMPUTER USAGE	1- 3	1 5/8	0	0.0
O	COMPUTONE SYSTEMS	4- 11	4 7/8	- 1/8	-2.5
O	CONSERV CORP	1- 6	2 1/2	0	0.0
O	CSP SHARE	6- 11	10 1/2	+ 3/8	+3.7
%	CULLINET SOFTWARE	14- 33	15 1/4	+1	+7.0
O	CYCARE SYSTEMS INC	18- 27	19 3/4	+ 3/4	+3.9
O	HOGAN SYSTEM INC	4- 15	7	+ 1/4	+4.6
N	GENERAL ELECTRIC CO	53- 65	63 3/8	+2 1/8	+3.4
N	GENL MOTORS E (EDS)	17- 47	44 3/8	+1 1/4	+3.1
N	GTE CORP	38- 45	41 7/8	+ 3/4	+1.8
O	INFORMATION SCIENCE	1- 6	2	- 1/4	-11.1
O	INFOTRON SYSTEMS CP	15- 35	18	+ 3/4	+4.3
O	KEANE ASSOCIATES	9- 19	13 1/2	0	0.0
N	LOGICON	24- 38	38	+1 1/2	+4.1
O	LOTUS DEVELOPMENT CP	16- 34	19	+ 3/4	+4.1
O	MCI COMMUNICATIONS	7- 11	10 5/8	+ 3/8	+3.2
O	MNGT SCI AMER INC	8- 16	10 3/8	+1	+10.6
O	MATHEMATICAL APP GRP	2- 9	2 3/8	0	0.0
O	MICOM SYSTEMS INC	14- 42	16 1/2	+1 1/4	+8.1
O	MICROPRO INT'L CP	2- 4	2 1/4	0	0.0
O	NATIONAL DATA CORP	7- 18	16 1/4	+ 7/8	+5.6
O	ON-LINE SOFTWARE INT	4- 10	6 3/4	+ 1/4	+3.8
O	PANSOPHIC SYSTEMS	11- 25	24 3/8	+2 3/8	+10.7
N	PLANNING RESEARCH	9- 19	18 5/8	+ 7/8	+4.9
O	POLICY MGMT SYSTS CP	18- 35	20 1/4	+2	+5.1
O	PROGRAMMING & SYS	4- 6	6 1/8	+ 1/4	+4.2
O	REYNOLDS & REYNOLD	28- 45	44 1/2	+1 1/4	+2.8
O	SEI CORP	11- 21	20 3/4	+1 1/4	+6.4
O	SHARED MEDICAL SYST	24- 35	33 1/2	- 3/8	-1.1
O	SCIENTIFIC COMPUTERS	5- 12	5 5/8	- 1/8	-2.1
O	SOFTWARE AG	11- 22	14 5/8	+ 1/4	+1.7
N	URS CORP	10- 14	11 1/4	+ 1/8	+1.1
N	UCCEL	9- 17	13 7/8	- 7/8	-5.9
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	3- 9	5	- 1/8	-2.4
A	ANDERSON JACOBSON	2- 11	2 3/4	0	0.0
O	AST RESEARCH INC	7- 23	21 1/8	+2 1/4	+11.9
O	AUTO-TROL TECHNOLOGY	4- 15	4 1/2	+ 1/4	+5.8
O	AVANT-GARDE COMPUTNG	6- 26	6	- 1/4	-4.0
O	BANCTEC INC	5- 12	9 1/8	- 1/4	-2.6
O	BEEHIVE INT'L	1- 2	1/8	0	0.0
N	BOLT,BERANEK & NEW	19- 32	30 5/8	-1 1/8	-3.5
O	CAMBEX CORP	1- 3	5/8	- 1/8	-23.1
N	CENTRONICS DATA COMP	3- 12	4 3/4	- 1/4	-5.0
A	CETEC CORP	6- 10	6 3/4	- 3/8	-5.2
A	COGNITRONICS	4- 7	4 3/8	+ 1/4	+6.0

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